

# ARMY

AUGUST 1970 • \$0.60

I have seen a great many  
soldiers in my lifetime  
and you, sir,  
are the finest soldier  
I have ever known.

*Henry L. Stimson*



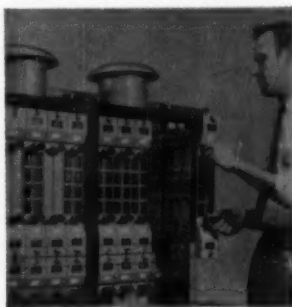
GEORGE C. MARSHALL, a soldier who didn't  
fear the future. By Mark S. Watson

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## *CopterNews from Sikorsky*

**Navy tests helicopter minesweeping.** A new job for helicopters—seeking and destroying enemy mines—was demonstrated by the Navy recently at Panama City, Florida. A Sikorsky S-60 lowered, streamed, towed and retrieved its new lightweight minesweeping gear. The test demonstrated the helicopter's capability as a self-sufficient aerial minesweeper, and it further demonstrated the vast gain in safety that a copter—flying above the explosive range of the mine—can bring to minesweeping operations. The S-60 is the first of a new family of all-purpose transports now under development at Sikorsky. These unique configurations require no conventional cabin to lift cargo, and can carry detachable pods for equipment, personnel or weapons.

**Copter catches five out of five as first air-to-air recovery is demonstrated.** New possibilities in aerial recovery of nose cones, drones, and reconnaissance missiles were revealed recently by the first demonstration of helicopter air-to-air recovery techniques. Using recovery gear developed by All-American Engineering Company, a Sikorsky S-55 completed five out of five pickups of a package suspended from a descending parachute. The demonstration, before Army, Navy and Air Force personnel, pointed up the copter's maneuverability for this mission. In case of a miss, for example, the copter can make several more passes before the chute hits the water or ground.

**Interservice news.** Not to be outdone by the remarkable helicopter feats of civilian telephone "pole planters," a Marine HR2S crew transported and planted a series of antenna poles each 92 feet long and 5,000 pounds in weight on California mountain tops. P.S. Mission was actually performed for the Air Force. Credit Marines with big assist on this play!



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# ARMY

A PROFESSIONAL PUBLICATION DEVOTED TO THE ADVANCEMENT OF THE MILITARY ARTS AND SCIENCES AND REPRESENTING THE INTERESTS OF THE ENTIRE U. S. ARMY

GEORGE CATLETT MARSHALL. Never afraid of the new and untried, he had the will to do whatever man can do. *Mark S. Watson* 22

PARTISAN TACTICS—ALGERIAN STYLE. Garrison forces engaged in desultory patrolling can't cope with aggressive movement. *Peter Braestrup* 33

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COVER by Tom Hickson



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# ARMY

## letters

### KOREA ISSUE

● The June issue makes up the most accurate and complete history of any military situation I have ever read.

Congratulations on the editorial, "No banners, no bugles, just fighting men," and to all who contributed. I hope Generals Dean, Meloy, Powell, Van Fleet, Coulter and Moore, as well as Colonels Heritage and Thompson see this issue.

I hope you printed enough copies so that all survivors of Korea can purchase one.

LT. COL. P. L. ROGERS  
Englewood, Colo.

● Your issue on Korea is good so far as it goes, but it missed the burning lesson of that war.

Our failure to throw everything we had at the enemy, including atomics, was a moral failure of a flabby, too-fat citizenry, fraidy-cat authorities, and self-serving allies. Until we realize this, the real lesson of the Korean war will remain unlearned.

No appraisal of the Korean war could be complete without these words writ large (they should have been on the front cover): *We lost in Korea because some of us didn't have the guts to fight to win.*

H. T. SORBEAN  
Chevy Chase, Md.

● May I take but a moment to tell

you how thoroughly I enjoyed "Korea: Ten Years After."

As a World War II Infantry officer who missed the Korean conflict it is a pleasure to see the men who fought in that "nasty war" get well-written articles about what a hell it really must have been.

KEITH A. MCNURLEN, M.D.  
Ames, Iowa

● Congratulations on the June issue. Without doubt it is one of the finest single numbers issued by any magazine. The articles by Colonel Rigg and Colonel Pan Mun Jom are especially excellent. But why single out examples when the standard of performance is so uniformly high?

You have really done a job this time.

MAJ. WALTER DARNELL JACOBS  
Arlington, Va.

● I have read and admired ARMY and its predecessors since 1941, and in my opinion the June issue is your finest.

I sincerely wish that General Marshall's outstanding article could be placed on the editorial pages of every newspaper and mass publication in the country. As one of those early committed to that war, I have long felt, but could not state, exactly what General Marshall has so aptly stated concerning the true worth of our

intervention. Despite our initial setbacks, and lack of a final tactical victory, I believe we did achieve a political victory and certainly a moral one, considering all aspects of the final outcome.

Today, we certainly have more public support for an adequate defense than we had in 1949 and early 1950. However, the Army continues to get the small end of the trough, and the major defense emphasis appears to still rely chiefly on today's equivalent of the B-36. Were the thinking public acquainted with General Marshall's splendid evaluation of the Korean war, I believe the Army would receive public support in its current struggle for funds, modernization, and tactical air-lift.

I also feel that General Marshall's article would go far to erase much of the public bitterness still existing over our intervention. Many of the bitter, of course, are those who suffered loss of relatives. Others are bitter because they still feel the U. S. had no reason for the sacrifice. I believe General Marshall's article will go far toward alleviating this bitterness.

LT. COL. ALEX HACKER  
Fort Bragg, N. C.

● Thank you for the magnificent Korean war issue. We have needed this coverage for a long time, and it brings home many lessons. As an auxiliary chaplain for the Navy during that war, I conducted burial services of many sailors and marines whose bodies were brought back from Korea. God rest them all!

I think ARMY is the finest military magazine published anywhere in the world. And I read a good many constantly.

CHAP. HARRY LEIGH-PINK  
Grass Valley, Calif.

● I enjoyed Master Sergeant Kleinman's "Truth of Taejon" in the June issue. However, I must point out one small discrepancy. He stated that the composite battalion of artillery consisted of all remaining elements of 24th Division Artillery except the 155mm howitzers of the 11th FA Battalion and one battery of the 52d FA Battalion.

I would like to point out that Battery A, 11th FA Battalion, was with the 34th Infantry from 8 July 1950 (the day I occupied my initial position of the Korean war on the Kum River) until the afternoon of 20 July in Taejon. My mission on the Kum River was to reinforce the fires of the 63d Field Artillery. I did this until the 63d was overrun.

After the 63d had been overrun,

### THIS IS THE ARMY — '60

The September issue of your Army magazine will contain a full report of the proceedings of the 1960 Annual Meeting of the Association of the U. S. Army.


You won't want to miss the transcripts of important talks

... on the military requirements of the free nations

... on the prospects and needs of the U. S. Army in the decade ahead.

FOR A FULL REPORT ON THE ARMY IN THE '60s  
LOOK TO YOUR SEPTEMBER ISSUE OF

# ARMY



FOR THE ARMY, MSVD is currently developing the LITTLE-JOHN nuclear arming and fuzing system shown undergoing vibration test . . . part of MSVD reliability test program.

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VEHICLE  
DEPARTMENT**

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safing, arming and fuzing concepts and techniques. These include the development of new fuze designs intended to overcome possible enemy counter-measures, the study of re-entry-stage arming for long-range strategic missiles, and development of direction sensing devices to aid in gaining even more reliable safing measures.

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General Barth flew me an order to displace. By now I had no communication with the 63d, so I could not know they had been overrun. I was to meet Colonel Roy Hatten and reconnoiter for new positions. During the following days I supported the 34th Infantry with one battery of 155mm howitzers. This action was east of Taejon. On 8 July we occupied positions on the Taejon airstrip. The remnants of the 63d formed one battery under Captain Anthony Stahowski and moved into positions on the Taejon airstrip on 18 July. During the night of 18-19 July one battery of the 13th FA under Captain Thomas Monsour occupied a position on the airstrip.

I moved out of the airstrip at 2200 on the 19th to occupy a new position on the northeast edge of Taejon. I remained here until 1600 of 20 July, when I was told by Colonel Hatten to get ready to reconnoiter for new positions south of the town.

I found that during my absence the North Koreans had thrown everything in their drive south. Some 50 per cent of my battery were killed, wounded, or missing.

Later, after talking with Lieutenant Terrell, my exec, I found he had started out of Taejon as I had instructed. He met an infantry major who told him to return and retrieve the howitzers. Terrell took 13 men. By this time the position was clear and they started moving the howitzers south through Taejon. Soon all roads leading south became blocked and the tractors couldn't get through. Some men were killed by small-arms fire attempting to drive the tractors through Taejon. They had to abandon the tractors and howitzers and attempt to move south on foot. Several were killed or captured. All earned the Silver Star and Terrell the DSC.

I would appreciate it if Battery A, 11th FA Battalion, could be given the recognition I feel it so rightly deserves.

LT. COL. JOHN C. HEARD, JR.  
Columbia, S. C.

● The Korea issue was a very good one, but what have we learned? Is our defense built up to the limits it needs to be? Our Air Force has a gigantic right arm in SAC, but its left one is not so good. Airlift is not husky enough to lift much more than another Task Force Smith to some place where glorious dying is the best deal available. The Navy is in better shape, but it could use a few things also. Our Army is equipped with a mixture of small-arms calibers, an assortment of nearly worn-out stuff from 1945, and a small batch of

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super-weapons still dripping with bugs.

Our 1950 defense budget would have wrecked the U. S. if it went over \$13 billion. If Mr. Truman had that decision to make under today's circumstances, he could not have. There would be a thrifty whisper from the back of the room, and the sacred budget would have won the day—but not for us.

Forty billion dollars brings us to the brink of disaster again, or so 'tis said. We can weigh the cost of 1950 now. We know what it cost us. We also know what it would have cost not to do it that way. We would have suffered a complete loss of face, and Moscow or Peiping would have been cheerfully chewing away at the other end.

Did we learn in Korea? In the vulgar but historical words of the Senator from Arkansas: Not only no, but hell no!

CWO JOHN P. CONLON

Newark, Ohio

#### FROM THE EDITORS

● The oral and written compliments on the June issue (of which the foregoing are representative) have left your editorial staff as smug as a basic private with a newly minted Good Conduct Medal. We are grateful and a little humble, too. It was an exciting experience to build a complete issue from scratch (a rarity for ARMY Magazine) and we couldn't have done it without the enthusiastic help of other members of your national headquarters staff and of our contributors.

We think we have learned a couple of things from it. One is that our readers want and will respond to articles that are of more than passing interest to them; articles that dig into the subject and say something worthwhile. We express the other lesson more diffidently, as a theorem to be thought about, discussed, and to be proved or disproved by history. This is that the Korean War seared deeper on the American soul more than any other of our armed conflicts except the Civil War. If this theory is correct, in the years to come—after we are long gone—there may be Korean War Round Tables at which the politics, strategy, and tactics of this limited conflict will be endlessly debated.

—J. B. S.

#### STARCHED FATIGUES

● Airman Dorr in his Cerebration [May] marvels at the spit and polish the Army puts into its work clothes. Maybe I can clear things up a little.

The Army is traditionally a spit-and-polish outfit. When we are not

fighting we have time on our hands, so we spit-and-polish our gear. That is part of our heritage. We are a proud outfit, a sharp outfit, and we stand tall. No one makes us starch our fatigues; it started with us.

We used to come to work in wrinkled fatigues, but somewhere along the line the old pride asserted itself and we began starching and pressing them. Now it's SOP all over.

You can still find wrinkled fatigues, like in a motor pool or at a tank park. But they were starched and stiff the day before yesterday. And how about people who work in offices? A soldier's own pride won't let him go to work in anything less than razor-sharp fatigues when all the others look sharp.

I think I see Airman Dorr's point. Maybe there are too many movies where the tough, rough soldier is dirty, unshaven, and wrinkled. Maybe this gives the impression that if work clothes are disheveled you look like a tough, rough combat soldier. We know we're rough, tough, and combat-ready, so we don't have to dress the part.

CPL. JACK W. ACLIN

Fort Benning, Ga.

● Congratulations on printing Airman Dorr's Cerebration. As an Army wife who washes, starches and irons an average of four to six sets of fatigues a week, I agree wholeheartedly.

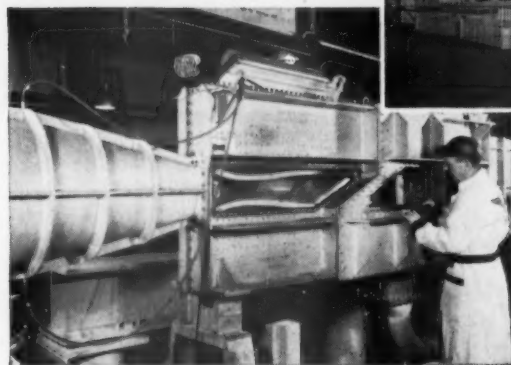
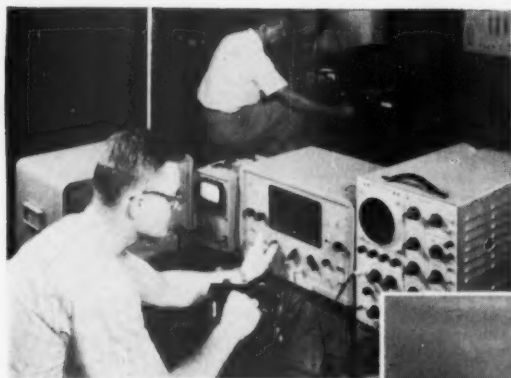
Has AUSA tried to do something about the clothing allowance? It isn't anywhere near adequate to cover the cost of the new articles required, let alone allow for replacement of worn-out pieces.

Also, can't uniformity be carried too far? When my husband went to the 3d Armored Division's Noncommissioned Officers Academy he had to buy all new cotton drawers because he didn't have snaps on them! How about the men who prefer the knit jockey type shorts? Why should they be required to have an extra set of underwear just for clothing inspections?

By the time a soldier has been in service long enough to be an E-5 or higher he should be trusted to have enough underwear and socks without having someone count and check them every year. These annual clothing inspections are an awful waste of everyone's time and money. Usually we end up buying new articles to replace perfectly serviceable ones because the standard of serviceability for a clothing inspection is unrealistic and is not applied for the rest of the year.

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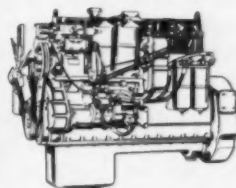
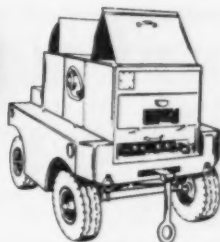
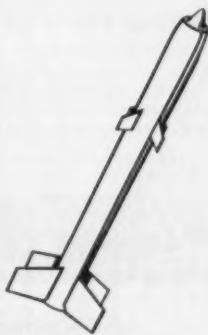
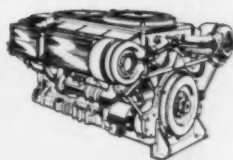
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### ABOUT OFFICIAL ORDERS

Everything we have said here is important, but here's an additional reminder: If you are on active duty, put a note on Form 3575 that your change of address is due to official orders (if it is) and this will insure the forwarding of all your mail, except, we regret to say, to and from an APO.

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fade evenly, so it is impossible to have three sets in which tops and pants are the same unless they are new. Darned spots to fill in battery-acid holes and other damage are accepted for duty use, but are rejected in an inspection. Also, patches must be sewed on by machine for an inspection even if they are put on by hand so that no stitches show. Not everyone owns a sewing machine.

Some of these things are of minor importance, but they are also a primary cause of many men not reenlisting. Many wives who have learned to live with long separations and sudden moves just can't take the petty things the Army seems to do that don't make sense. (One example is moving unit patches from sleeve to chest, and then a few months later putting them back on the sleeve.)

DOROTHY I. RICE

Temple, Tex.

● Perhaps Airman Dorr hasn't thought about the purpose of wearing a uniform, fatigue or other, or why it should be kept neat.

I have visited Air Force bases on several occasions, and have also observed airmen in public places. They, too often, appear disreputable in the class A uniform. After seeing them in their own version of the fatigue uniform, it is easy to see why their jackets are untucked, their trousers unbloused, and their footgear gives the appearance of having been polished with a chocolate bar.

Part of being a military leader is to require high standards of appearance among your subordinates. Part of being a soldier is to look as neat as possible at all times. When standards are allowed to slip in wearing fatigues, they will slip to similar levels with the class A uniform.

A military leader strives for perfection in everything his unit does, including appearance, regardless of the uniform of the day.

Part of being a soldier is having pride in the uniform. How can one have pride in a sloppy uniform? Usually, a person feels just about the way he looks.

SGT. J. HAROLD THOMASON  
APO 34, New York, N. Y.

### MECHANICAL SENTRIES

● Captain Hogan's account of how the antique system of pre-electronics guard duty works out in Korea [Letters, June] was worth noting. In fact, the one general order dropped some years ago [the one that admonished the sentry not "to allow a nuisance to be committed on or near" his post] would still apply there. And

as I am told by a missionary from whom I hear occasionally, when something is stolen, perhaps the orders of the guard require him to help the thief over the fence with it so as to avoid trouble.

There are a couple of mechanical helpers that might be used by the lads at APO 7 who are trying to keep what they have. You can't lay mines for the slickies, but don't we have something similar?

For some years we have issued what is called a booby-trap simulator. This teaches how to arm and carefully approach real mines. I find them of great help but whatever the label says can't be depended upon.

Much more reliable are the series of standard firing devices with M80 firecrackers hung on the spout. They go off almost every time and the M80 usually can be relied on to rouse the area for hundreds of yards around. In a wet climate the M80 would be hard to weatherproof, but perhaps a variation might be issued with a plastic threaded adapter ready to screw on. Along with this we have the T34 plastic practice mine. I am not sure how this would go for a barefoot infiltrator; it might give him a royal hotfoot.

Use of these devices might give Captain Hogan and his men a bit of aid that works 24 hours a day. They might also consider getting a good dog that can be trained for sentry duty. He'd better be trained right, or he'll wind up in a stewpot.

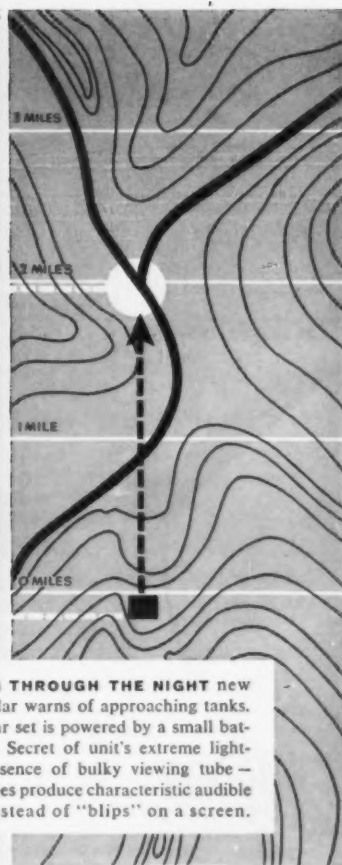
BOOBY TRAPPIST

### LEARNING TO SHOOT AND SCOOT

● CWO Conlon offers sound advice indeed in his letter to the editors [June]. Aspiring young airborne reconnaissance troopers find military history replete with exploits which can be interwoven easily with the meager storehouse of official doctrine available to them.

The 82d Airborne Division adapted Stirling's reconnaissance techniques during problems preparatory to Exercise Dragonhead; granted, these were only paper exercises, but the terrain and situations involved freely invited Stirling's methods. Division recon platoon leaders draw heavily on the experiences of widely divergent innovators ranging from Mosby and Sheridan through Wingate, Darby, Skorzeny and Mao, to less renowned experts like Sam Wilson, formerly a reconnaissance platoon leader with Merrill's Marauders. Sources of inspiration are almost inexhaustible; adaptations are limited only by the trooper's ingenuity.

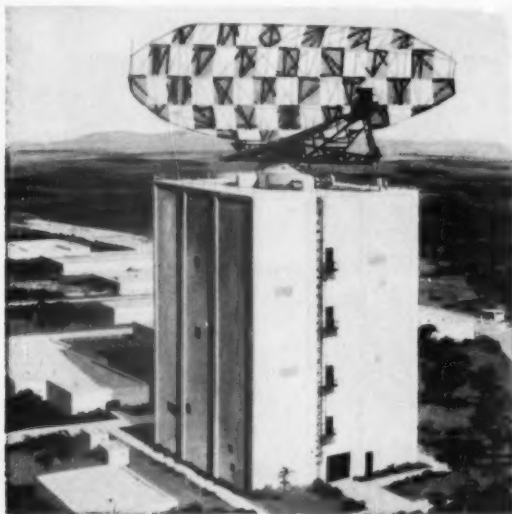
MAJ. JOHN M. COLLINS  
APO 23, New York, N. Y.



**PROBING THROUGH THE NIGHT** new Sperry radar warns of approaching tanks. 35-lb. radar set is powered by a small battery pack. Secret of unit's extreme lightness is absence of bulky viewing tube—radar echoes produce characteristic audible signals instead of "blips" on a screen.

## Army has "Silent Sentry" Radar for front-line use

**SPERRY RADARS** range in size from the tiny "Silent Sentry" (above) to the giant Air Force Early Warning Radar, the AN/FPS-35 with its 85 ft. tower and 126 ft. antenna. These towers of strength in U.S. defenses will be spotted strategically throughout main Air Force defense networks.



Army troops are now able to call upon the country's first production equipment of this size. The device—designed to warn of surprise over-the-ground infiltration or major attack by an aggressor—greatly enhances the effectiveness of battle area surveillance.

Developed jointly with the Army Signal Corps, this new Sperry portable radar instantly reports any movement of men or vehicles within a three-mile range—at night, in fog or smoke. So accurate is the set that it can detect one soldier walking a mile away and can distinguish between a single individual and a squad of several men. It is also sensitive enough to determine the approximate size of a vehicle target and indicate whether it has wheels or tracks. This new "Silent Sentry" is one more result of the joint efforts of our military leaders and Sperry to keep our defenses up-to-date.

The "Silent Sentry" (AN/PPS-4) is one of a broad variety of radars manufactured by the Surface Armament Division of Sperry Gyroscope Company.

# SPERRY

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## The ideal Light Observation Aircraft

**PROBLEM:** To provide a *Light Observation Aircraft* for military use for:

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- Target Acquisition Missions
- Reconnaissance Missions
- Command and Control Missions
- Necessary utility tasks required at the combat Company level.

**SOLUTION:** The Light Observation Helicopter...a concept pioneered by Hughes and demonstrated in the Hughes *compact* helicopter:

...whose small size, quick response and minimum silhouette make it a difficult target to locate and attack,

...with superior handling qualities, outstanding performance and a small rotor diameter which enable it to operate in confined areas denied to other craft,

...whose rugged construction, easy maintainability and reduced logistic requirements permit around-the-clock combat area operations in even the roughest terrain,

...with a speed capability adequate for completion of all mission assignments *without sacrificing*: range, rate of climb, hovering ability, confined area performance or ease of maintenance—*without increasing*: initial cost, operating costs and logistic support requirements.

World-wide Army field tests of the Hughes YHO-2HU have proven the mission capability, reliability, ease of maintenance and performance of the compact helicopter for command use in Company-level combat operations.

*Please write today for full-color brochure, with complete information on the compact helicopter concept. An interesting color motion picture is available for showing to your group.*

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# ARMY

## authors

AUSA's annual banquet henceforth is to be known as the "George C. Marshall Memorial Dinner" and appropriately the speaker this year will be Robert A. Lovett, a close colleague of General Marshall during the Second World War, in the State Department and in the Department of Defense during the Korean Conflict. It seemed fitting that ARMY magazine also honor General Marshall on this occasion and therefore we asked MARK S. WATSON to write an appreciation of General Marshall. Mr. Watson, who has been the military correspondent of the *Baltimore Sun* for many years is well qualified for the task. During World War I he served at Pershing's AEF headquarters, and also on *Stars and Stripes*. At GHQ he knew Major George C. Marshall, who also served there, but doubts that General Marshall ever recalled the fact. He next saw Marshall in 1939 when the latter came to Washington as Vice Chief of Staff. During the years of the Second World War and after, the acquaintanceship became closer, though never intimate, because, as Mr. Watson has said, "no one was ever intimate with Marshall." After World War II Mr. Watson took a sabbatical from the *Sun* to write *Washington Command Post: The Operations Division*, a volume in the Army's official history, and through this research his appreciation of General Marshall increased.

If the negotiations under way between the French Government and the Algerian rebel FLN (National Liberation Front) to bring about an amicable settlement fail, the sixth full year of armed rebellion will be marked on 1 November. For the enterprising reporter, historian or military observer on the spot, a wealth of knowledge of partisan conflict can be acquired in situations like the one in Algeria. PETER BRAESTRUP, a former Marine Corps officer who served in Korea, had such an opportunity as a *Time* magazine correspondent and recorded it as the article beginning on page 33 demonstrates. From his notes and from other research, Mr. Braestrup prepared this article while studying under a Nieman fellowship at Harvard University,

after which he joined the Washington Bureau of the *New York Times*.

What are the essentials of combat mobility? What must we do to achieve our maximum potential in this vital area? These topics are explored by Col. DONALD MCBURNEY CURTIS (page 64), in his fourth contribution to ARMY. Col. Curtis, Artillery, a battery commander and G4 in the 1st Infantry Division during the Second World War, more recently served with the Combat Development Experimentation Center at Fort Ord. He is now on duty in Alaska.

From that northernmost state comes another look at mobility. This by Maj. FRANK B. CASE, Transportation Corps (page 50), whose previous effort for ARMY also had a chilly setting ("Antarctic Trailbreakers," July 1957). Maj. Case uses the 1960 winter maneuver of U. S. Army, Alaska, to show that improved support capabilities are needed if we are to exploit to the fullest our tactical mobility potential.

Soviet emphasis on free-flight rockets is given a critical eye by JAMES D. MCGUIRE (page 45), who goes into the history and development of this relatively new and mobile kind of firepower. A veteran of the Second World War, Mr. McGuire's present labors are as a civilian employee of the Army in the depths of the Pentagon.

The mathematical concept of strategy known as "theory of games" tends to be obscure and difficult to comprehend. But JOHN E. NOLAN has made good sense out of the theory in the article beginning on page 77. He applies the theory to the battle of Guadalcanal and suggests that the application of the game theory to tactical situations is worthy of further study. Mr. Nolan is a graduate of Annapolis, class of 1950, and was a Marine Corps rifle platoon leader and battalion intelligence officer in Korea. A captain in the Marine Corps Reserve, Mr. Nolan is an attorney in private practice in Washington.

The awesome possibility of a nuclear war calls for new battlefield strategies and new concepts of defense, according to Col. JAMES H. HAYES, who offers some solutions

to problems we may have to face (page 67). Col. Hayes, Infantry, until recently was Chief of the Doctrine Publications Office of The Infantry School. This is his sixth contribution to this magazine.

AUSA's new President, Lt. Gen. MILTON G. BAKER, takes us on a guided tour of historic Independence Hall in Philadelphia (page 61) and tells about AUSA's plans to establish a memorial at the birthplace of the Army and the foundation of American independence.

CHARLES S. STEVENSON, ARMY's roving correspondent, reports this month on one of his shorter excursions—to the Army War College at Carlisle Barracks, Pa. Mr. Stevenson participated in the Army's National Strategy Seminar there, and he presents an interesting account of how the seminar works (page 82).

The concept of a "Combined Arms Battle Force" (page 86) is advanced by Capt. WILLIAM M. GLASGOW, who warns that we must act now to reduce the Communists' advantages in ground equipment. Capt. Glasgow appears in ARMY for the eighth time. He was commissioned in 1945 and served with the 2d Infantry Division in Korea.

The tank, although a weapon to be feared, is not invulnerable and the 101st Airborne Division's Recondo School has developed some solutions to tank fighting which are described by Lt. HAROLD C. LYON, JR. (page 74), an instructor at the Recondo School. This is his second article in ARMY.

This month we include six Cerebrationists. Capt. ELMER H. BIRDS-EYE, Artillery, is an assistant professor, Department of Earth, Space, and Graphic Sciences, USMA (formerly the Department of Military Topography and Graphics). Capt. JOHN R. BRINKERHOFF, Corps of Engineers, is currently an instructor in the same department as Capt. Birdseye. Capt. JAMES C. BOWMAN, Infantry, is with the G3 section of XVIII Corps, Fort Bragg. Maj. JOHN P. TYLER, III, Artillery, is a veteran of combat in Korea, and has a master's degree in physics (nuclear effects engineering). He is now on duty in the Pentagon. Lt. Col. RALPH B. VOTE, JR., CMP, is Deputy Post Provost Marshal at Fort McPherson, Ga. Maj. PAUL M. CROSBY, Armor, has had World War II and Korean service in combat engineer units. Formerly with the Armor School at Fort Knox, he is now attending the CGSC.



An achievement in  
defense electronics

NEW THERMOPLASTIC RECORDING DISPLAY ACHIEVES

## Detection to Projection in Less than a Second

Large-screen display of radar signals can be recorded and projected in less than a second. This advanced technique in information display is an example of one application of the new thermoplastic recording system developed by General Electric.

The grainless, thermoplastic film eliminates processing delays and permits, with higher resolution, much greater enlargement than is practical with high-speed photographic film. Target delineation is also significantly improved by optical filtering used to increase the signal-to-noise ratio.

Now undergoing final development in General Electric's Electronics Laboratory, the "thermoplastic display" is expected to find maximum application in the high-speed radar systems of the future.

176-03

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DEFENSE ELECTRONICS DIVISION  
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**New GMC 6x6 hauls  
3½-ton payload,  
carries 14 men.**



**New 8x8 has  
5-ton load capacity  
and carries 16 men.**



# NEW FLOATABLE GMC TRUCKS PROVE MAJOR ADVANCE IN TROOP AND CARGO TRANSPORT

These highly versatile medium-duty tactical trucks can transport troops and cargo on land or water.

Air droppable, these rugged GMC 6x6 and 8x8 vehicles draw upon military vehicle design and manufacturing experience dating back more than 40 years.

Powered by an outstanding, new V-6 diesel, these trucks have lightweight aluminum cabs and cargo bodies and heavy-duty chassis with extensive interchangeability of components.

Designed to minimize service and repair wherever possible, these new vehicles eliminate the need for chassis lubrication; bearings are of a more permanent, longer-wear material; air cleaner goes longer without attention; brakes are sealed and ventilated; universal joints are permanently lubricated; and, there are no engine belts to replace or maintain.

Rubber-sealed aluminum cabs and cargo bodies permit both vehicles to float over water, where they are propelled by the rotation of the wheels or by a special installation propeller drive and rudder.

On land, the units can be placed in all-wheel drive or just rear-wheel drive by a simple, one-lever control. In full drive, they can negotiate 60% grades, move easily through mud, snow or sand.

Water speed ranges up to three miles per hour, highway cruising speed can top 50 mph.

## Here are some of the engineering features of the new GMC medium-duty tactical vehicles

### CHASSIS

High-tensile 950 steel frames with a functional, air-tank front crossmember.  
Radius-rod suspension, with most radius rods interchangeable within the medium-duty vehicle family.

Interchangeable differentials and axles.

Traction-equalizer axles that permit the wheels to utilize 70% of the torque input.

Adjustable steering column that can be positioned up or down, fore or aft, even folded on the seat.

Sealed hubs and brake drums with air circulation preventing water condensation or seepage.

Power steering on 8x8, with provision for power steering on 6x6.

4-speed synchromesh transmission with two-speed clutch.

Stainless steel exhaust system.

Integrated brake control with unitized components and weight-saving features.

### POWER PLANT

6V-53 two-cycle diesel engine.

190 gross horsepower at 2800 rpm.

All engine accessories gear-driven, eliminating belts.

Easily accessible air cleaner and oil filter.

Oil-cooled generator.

Transistorized voltage regulator.

### CAB

All-welded aluminum, dry and buoyant, two-man cab.

Three-point suspension to eliminate transmission of frame torsion to cab.

### CARGO BODY

All-welded aluminum with extensive use of extrusions.

Three cargo doors, one at rear and one at each side, for palletized loading. Rubber-hinged and interchangeable.

Central control latches for opening and securing door gates.

Extruded aluminum cargo floor.

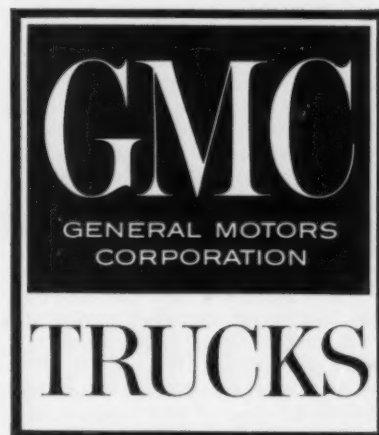
Fold-up or removable troop seats.

Ample tool storage space.

Four drainage valves controlled by air pressure from cab.

Rubber mounts minimizing torsional stress on body.

From ½-ton to 60-ton ...  
General Motors leads the way!



GMC Truck & Coach,  
a General Motors Division  
Pontiac, Michigan

**Army Modernization**

*From the report on Army Modernization of the Preparedness Subcommittee of the Senate Armed Forces Committee:*

The destructive capabilities brought about by scientific and technological advances during the past decade in the field of weapons and missiles stagger the imagination. Yet, in the event of war, man will still be pitted against man to insure the final victory and to enforce one nation's will over that of another. . . . It is the solemn responsibility of the United States to insure that, in the event of such a final man-to-man contest, our soldiers enter the battle with the most modern armament available, for only by possessing this advantage can we expect him to keep this Nation free.

\* \* \*

Facing our Army units across the Iron and Bamboo Curtains, the massive land forces of Russia and Red China are being maintained at a high level of readiness. The equipment of the Russian forces has been modernized more than once since World War II. The Red Chinese have received from Russia increasing amounts of weapons and equipment of World War II vintage. The requirement for Army modernization to meet the threat of the Sino-Soviet bloc cannot be emphasized too strongly.

We must insure that the American soldier is the best equipped when and if he is called upon to stand up against the vastly superior numbers and often superbly equipped forces of the Communist world.

Deep concern with the much discussed "missile gap" and the "space race"—important as they are—sometimes tends to overshadow the fact that there is also a deadly serious contest afoot in many other elements and facets of military capability. To insure that our Nation and the rest of the free world is capable of resisting the threat facing us in the field of conventional ground warfare, the Army must possess new modern weapons and equipment so it can achieve the necessary improvements in firepower, mobility, and communications required on present and future battlefields.

**When the best of weapons are needed**

One of the stories of the Korean conflict that didn't get into our June issue (but should have) had to do with the improved bazooka that wasn't available to Eighth Army in June 1950 when North Koreans poured over the 38th Parallel with Russian T-34 tanks. This improved bazooka had been developed after the end of the Second World War but restrictive budgets had precluded its quantity production. Consequently when the cry came from Korea for something to stop the Russian-made tanks, the few of these new bazookas in existence were rounded up and flown to Korea; factories began to pour them out and early deliveries were flown to the battlefield too. This was a magnificent demonstration of our "arsenal of democracy" in action but it was small consolation to many an American and South Korean soldier dead or a prisoner partly because weapons that could have helped turn the tide of battle weren't available when the conflict began.

This unhappy episode could be repeated tomorrow or the day after. And the fact that this is true is why the Army has a critical modernization program that must be met forthrightly by the American people and their government.

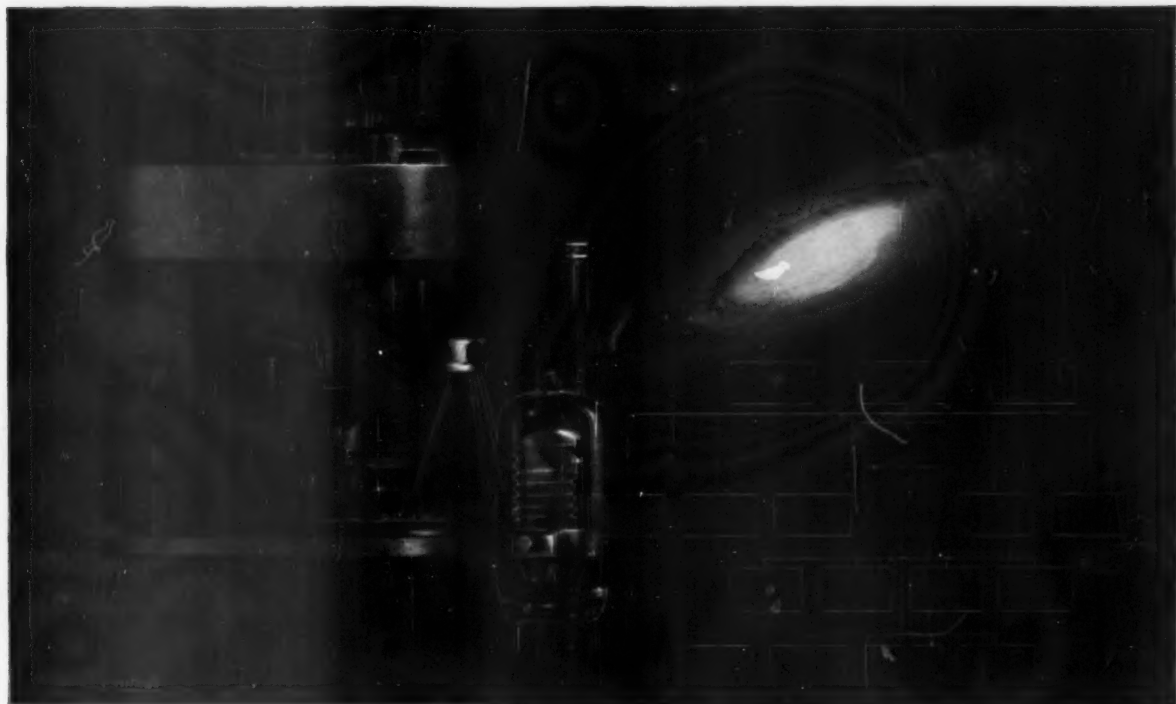
A few months ago the Army displayed its needs at Fort Benning in a demonstration called Project MAN (Modern Army Needs) attended by President Eisenhower, Secretary Gates, other defense officials, a few members of the Congress, officials from defense industries, and the press. The display of post-Korean rifles, machine guns, artillery pieces, tanks, armored personnel carriers, missiles (both SAM and SSM), trucks, aircraft (fixed wing and whirlybirds), radios and radars, and much other equipment could well have left the uninitiated with the idea that the U. S. Army was not only on the ball but was in damn good shape. There is some evidence that some did leave with this impression and if so it may be that the "hard sell" wasn't made emphatically enough. There was insufficient stress on the disagreeable truth that the weapons and equipment on display were in many cases like the pre-Korean bazooka, good and necessary weapons but unavailable *now* to our deployed forces and first line reserves because funds for production have not been provided.

The best of weapons are needed—as the pre-Korean bazooka was needed—when the fighting starts and not days, months or years later. As a recent Senate Armed Services Subcommittee report on Army modernization states: "It is the solemn responsibility of our Nation to insure that in the event of a conflict involving the United States, that our military forces enter the battle with the latest armament available. Only by possessing this advantage can we expect them to keep this Nation free."





# Military Communications Systems



ITT KELLOGG is proud of its especial talents that help give continued strength to America in an age of unusual and tremendous break-through and advancements. The missile and space age brings with it a necessity to do things faster, better . . . to create new concepts and truly pace

progress. ITT's scope and diversity of activity give Kellogg, moreover, a unique position in the fields of electronics and telecommunications . . . providing a broad base of experience on which its record of pioneering and performance is built.

\*Communications Contractor for the Air Force's Atlas Missile

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*Kellogg invites participants at the AUSA Show, August 8-10, to visit the Kellogg and ITT exhibit.*

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# GEORGE CATLETT MARSHALL

MARK S. WATSON

As a soldier who was never afraid of the new and untried and who, through a long lifetime always had the will to do whatever man can do and do it fully, General of the Army George Catlett Marshall would have understood what drives American space scientists to look into what is now unknown. It is fitting, therefore, that the nation's new space center at Huntsville has been named in his honor.

Throughout his responsible years General Marshall faced many hard decisions, grappled with many difficult problems and overcame many near-impossible situations. It was ever his habit neither to yield to problems nor to evade them. Beaten back, he gathered new strength and tried again; one weapon failing, he tried a different one; one suggestion rejected as impractical—and proved *impractical*—and he would

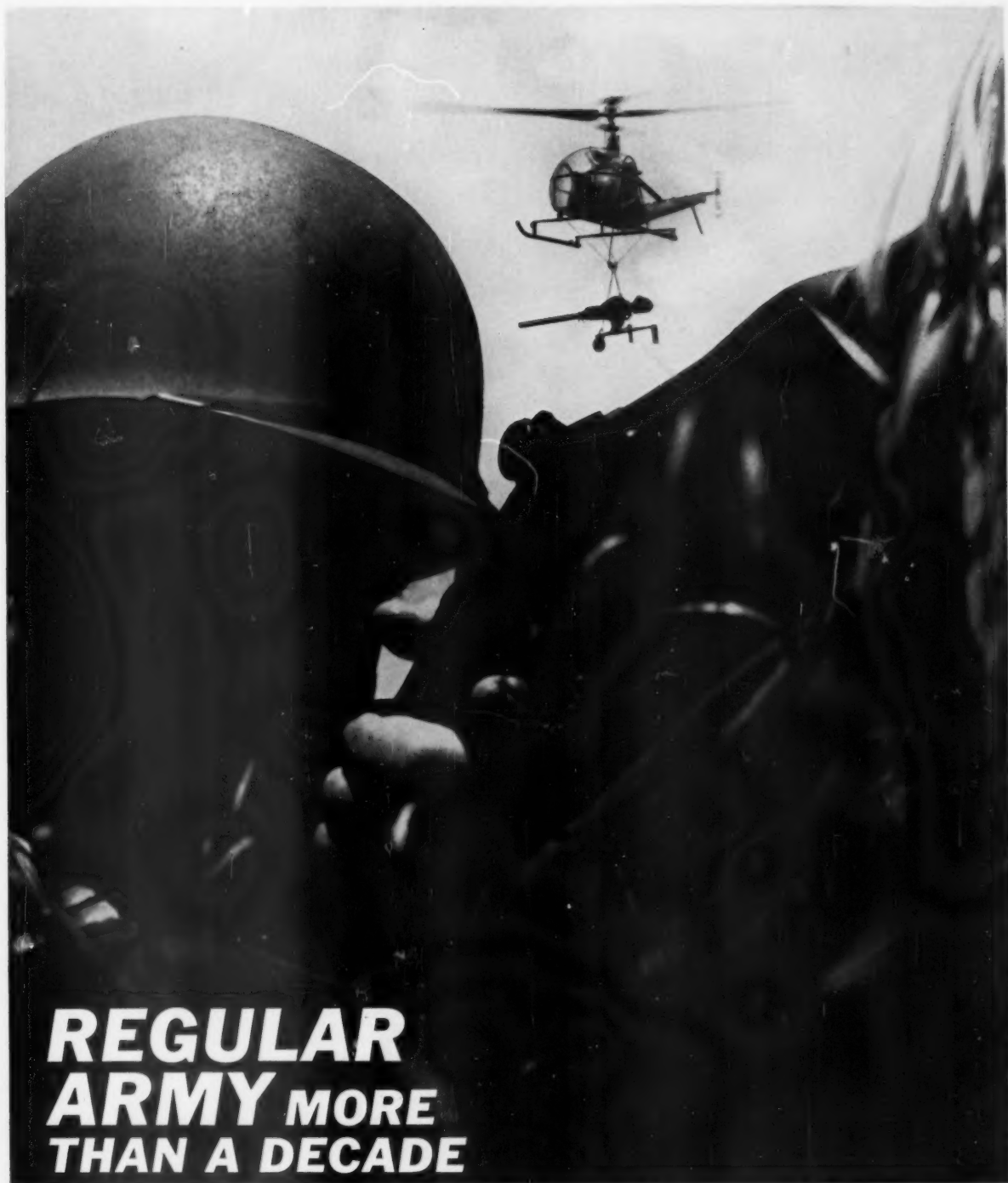
think out a better one. But first he had to be proved wrong.

A pre-Normandy episode illustrates this.

As the Army's Chief of Staff, he had sent a group of planning officers to England to present a somewhat radical suggestion to the group at COSSAC (Chief of Staff to Supreme Allied Commander, later redesignated SHAEF) then working out the broad plans for invasion. The suggestion involved, thus early, the strategic rather than exclusively tactical employment of airborne forces and, in the conservative thinking of that day, represented a risk beyond any then calculated.

Marshall's suggestion was in fact impractical and, in the light of all information now at hand, should have been declined—as it was. But a grim expectation of COSSAC's rejection of a "new" idea simply because it was new led Marshall to send this advice (10 February 1944) to General Eisenhower:

(Continued on page 26)



# **REGULAR ARMY MORE THAN A DECADE**

*The Army has a valuable investment in the experience of the professional soldier.*

*Hiller has the same mark of a professional soldier—experience.*

*Since 1944 when our first spindly Model XH-44 flew, Hiller engineers and the men who run our lathes, drill presses and rivet guns have accumulated the know-how to build the most dependable helicopters in the world.*

*Designs are one thing. Deliveries another. Both come from*

**HILLER**  
**AIRCRAFT**  
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PALO ALTO, CALIFORNIA • WASHINGTON, D.C.  
Adhesive Engineering Division • San Carlos, Calif.

# NEW MOBILITY FOR THE ARMY NAVY, MARINES AND AIR FORCE

... WITH THE ALL-SERVICE, MULTI-MISSION VERTOL 107

The twin-turbine powered Vertol 107 can efficiently perform the varied missions of the Army, Navy, Marines and Air Force — without changes to the basic aircraft.

Because the Vertol 107 lands and takes off from both water and land, it can sweep mines, perform anti-submarine warfare missions and transport assault troops. This tandem-rotor helicopter provides new air mobility for crew served weapons ... can, in fact, internally airlift a complete Little John system and crew, permitting fire to be laid on a target 60 miles away 35 minutes after receipt of orders. The Vertol 107 is also capable of around-the-clock, all-weather support of remote, widely dispersed missile launching sites. With equal facility, this one helicopter can perform medical air evacuation, air/sea/land rescues, and even tow ships and tanks.

Contributing to the Vertol 107's across-the-board versatility is its large, unrestricted cargo capacity and straight-in rear ramp loading, which permit loads to be transported internally, externally, or half-in, half-out.

Whatever the service, whatever the mission — the Vertol 107 offers a new magnitude of air mobility.

**VERTOL**

DIVISION

MORTON

PENNSYLVANIA

**BOEING**







The trouble with this plan is that we have never done anything like this before, and frankly, that reaction makes me tired. Therefore I should like you to give these young men an opportunity to present the matter to you personally before your Staff tears it to ribbons. Please believe that, as usual, I do not want to embarrass you with undue pressure. I merely wish to be certain that you have viewed this possibility on a definite planning basis.

### THE HARDER THE STRUGGLE, THE BETTER

How often in his long professional life Marshall must have heard arguments in favor of doing nothing in a new way. How often he demonstrated that the new way was the right way, beginning perhaps with that historic field exercise in the Philippines, when, as a lieutenant, he performed his senior's duties and won a memorable commendation from the maneuver commander, the discerning General J. Franklin Bell. How many times, later on, himself at last in command, he pressed on his staff and his commanders the need for an energetic restudy of a baffling problem and a reaching for some new approach to its solution. How many times, days at the Pentagon ended, he must have seen his own successors exasperated by like problems brought on by like examples of their subordinates' (or their superiors') apathy and hesitation. And with what satisfaction in his late days he must have read of the pioneering of our space scientists, and admired men whose prime interest was in trying things which had *not* been done before. Modest as he was, one must believe Marshall would be proud today, knowing that his name will hereafter be associated with future efforts to try something never tried before. And the harder the struggle, the better, Marshall would no doubt say.

Indeed, he did say something very like that, in an address to the graduating class at the new Officer Candidate School at Fort Benning, on 18 September 1941. The subject was "Leadership," in which General Marshall in the two years he had been Chief of Staff had been showing a great deal of interest. The date is interesting, too, for in those two years of desperate struggling toward preparedness against a war now less than three months away, Marshall had been faced with a great many difficulties. Said he to the young officers: "The truly great leader overcomes all difficulties, and campaigns and battles are nothing but a long series of difficulties to be overcome."

### STERN, FAIR JUDGMENTS

There was a touch of that spirit, too, in what he once told the House Committee on Military Affairs, when he was emphasizing the need for stern judgments, rather than amiable tolerance, in selecting only vigorous men for field commands: "Leadership in the field depends to an important extent on one's legs and stomach and

nervous system, and on one's ability to withstand hardships and lack of sleep and still be disposed energetically and aggressively to command men—to dominate men on the battlefield."

Ability to overcome difficulties, physical or otherwise, is one of the first needs of the soldier, recognized by the soldier himself. It is not so rare a possession as that other quality, previously mentioned, of looking beyond today's difficulties, beyond even tomorrow's needs, and out into the more distant future. Earlier generations of soldiers, to be sure, had no such acute need of long-range vision. Their weapons did not change greatly, if at all, from one decade to another. And even when a new and tremendous weapon did appear, it did not instantly come into wide use. Gunpowder doomed the bow and arrow but did not displace it from effective battle use for a long time. The rapid-fire gun did not end mass tactics nearly as soon as reason tells us it should have brought a change. The tank, which ought to have achieved far more than it actually did in World War I, came into its own three decades later, when tactics at last caught up with the potential that weapon offered.

During World War II, however, the weapons replacement cycle began turning much more rapidly. With it, tactics also changed, and organization accordingly; and as the years have unrolled, military planning itself has explored and is exploring new possibilities and new and necessary relationships with activities which the old-time soldier refused to think of as being even within his realm. It would be ridiculous to think of today's American military establishment as different from others only in size and in the power of its weapons. It has been transformed into a new creation. Much of the transformation began under Marshall, and while there were a great many agents in the transformation, it is apparent to the post factum observer that the greatest single influence in many of the changes was exercised by General Marshall.

### RECOGNITION OF NEW WEAPONS

Himself a ground soldier, coming to head the Army with the hearty support of great ground soldiers, Marshall was the first Chief of Staff to see that if airpower was to provide the U.S. military establishment with maximum support, it would have to be given not only far more planes and pilots but also far more freedom for its own development and far more command authority as well. Finding a sympathetic ear at the White House, he pressed this belief so strongly that when the wartime Joint Chiefs of Staff came into being, it was with General H. H. Arnold of the Army Air Forces as co-equal with Marshall of the Army and Ernest J. King of the Navy at the

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Joint Chiefs table. An incongruous arrangement, to be sure, for in his other role as Chief of the Army Air Corps Arnold was not equal but very definitely subordinate (and willingly so) to Marshall as Army Chief of Staff.

Incongruous or not, the arrangement provided probably the only immediate means of getting what Marshall wanted: national recognition of the air arm as a planning and operating equal of the others. This was made almost a practical necessity by the fact that Great Britain had already created its own Royal Air Force as a separate arm, and for the U. S.-British consultations of that period was itself sending to the Washington conference for combined war planning its own co-equal Chiefs of Army, Navy, and Air Force. Today's more conventional and logical arrangement, of U. S. Army, U. S. Navy, and U. S. Air Force as wholly separate elements under a Secretary of Defense, could wait until World War II was over, and it did.

But it cannot be forgotten that the first great pre-unification move in that direction, with Arnold wearing just as many stars as his Army superior, came about by Marshall's long-range recognition of future certainty. Nor can it be forgotten that, long before the war was over, he proposed a high-level study of how the unconventional, wartime status of the Air Forces chief as a co-equal could best be transformed into a logical, statutory reality. Out of that Marshall proposal emerged in time the special study by two extraordinarily wise and tactful officers, General Lauris Norstad and the late Admiral Forrest Sherman, from whose prolonged and patient and amiable discussions and persuasions at length came the basic and essential interservice agreement for unification. Marshall, to be sure (and General Eisenhower as well, Chief of Staff in 1947), wanted a much more substantial unification than Congress provided; to this day there is more than one thought on the subject.

## DECISIONS THAT SHAPE THE FUTURE

It was while Marshall was Secretary of Defense that his ability to look ahead led him to force action in missiles, much as a decade earlier he had forced that important step in airplane development. At the time referred to, all three armed services were pushing their rocket and missile development with more vigor than coordination, and with less sureness of attainment than Marshall himself found desirable. Each service and each missile project had its warm supporters, and a Secretary of Defense, already deep in a multitude of administrative responsibilities, recognized his own limitations. The need, he felt, was for an industrialist of proved competence and experience and reputation who, without executive

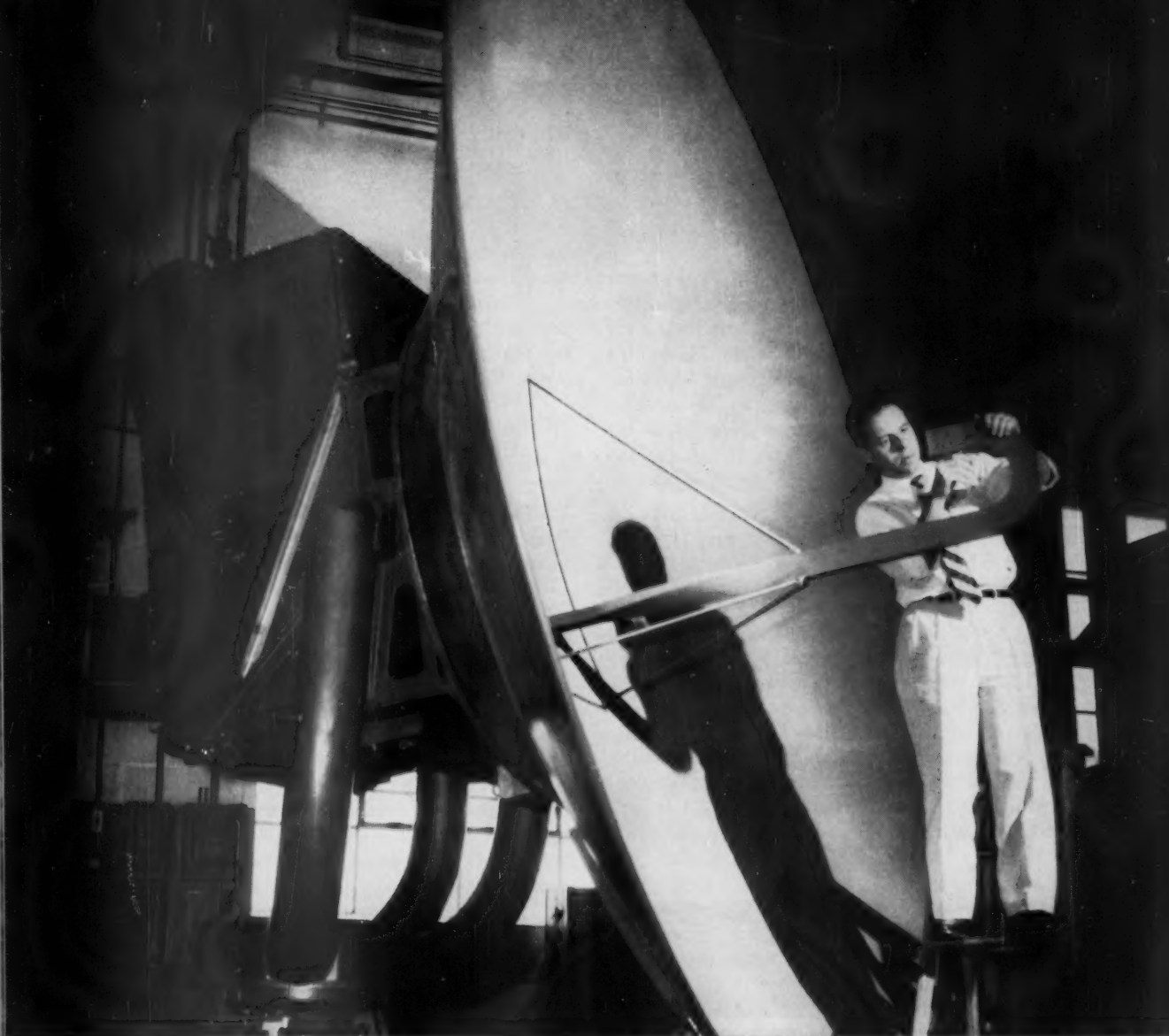
powers of his own, could scrutinize understandingly a very complex technological puzzle, reach a bold decision as to immediate requirements, and make the needed bold recommendations for action. K. T. Keller was brought in, certainly not as "missile czar" of popular fancy in that day, but as an expert in industrial process with the necessary will to recognize when further research and development cannot be allowed to delay longer a start on production of a weapon. It was Keller's report to Marshall which resulted in an order to go ahead with a limited number of "good" missile projects instead of waiting longer for "better" ones which might come to reality too late. The decision was Marshall's.

How many decisions of that sort he had made during his days as Chief of Staff is impossible to say, for it was a period of many decisions on many subjects in many realms. In countless instances, the ultimate responsibility certainly was his, surely even when the recommendation had been made by a competent and trusted subordinate after such careful study that the Chief of Staff and the Secretary in his turn could rarely reject the recommendation. The decision to go ahead with the jeep is an example; already fully developed by a far-seeing industrial research group and heartily urged by Ordnance, this pioneering field device had such promise that General Walter Bedell Smith, then Secretary of the General Staff, pressed it insistently on his chief, and Marshall gave the go order. Full confidence in General John E. Hull and General Thomas T. Handy must have had great influence in guiding their chief to other momentous decisions.

In the era as Secretary of State, similarly, it was probably the earnest recommendation of Robert A. Lovett and George Kennan—and nobody knows how many other old military planners—which supported this new statesman-soldier in setting up the State Department's first planning section, under Kennan, which Lovett later developed—again an effort to provide a corpus of knowledge which would justify a new forward look in statesmanship, as the wartime Operations Division at the Pentagon had justified so many far-seeing decisions in warmaking. It is worth recalling that the early negotiations for NATO itself came when Marshall was Secretary of State, and its implementation when he was Secretary of Defense.

## THE JUDGMENT OF HISTORY

What is the measure of George Marshall's place in history? The few years which have passed since his retirement are not enough to offer a sure judgment. Yet they are enough to justify a belief that, for all the glory of his achievement as the professional chief of the Army in its days of trial



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EXCELLENCE IN ELECTRONICS

and victory, his most fruitful single action was the later presentation of the Marshall Plan. The very thinking which went into it went very far beyond that which had guided America through World War II—that Unconditional-Surrender, Field-Victory-and-Nothing-Else concept which unhappily led to postwar defeats.

In the proposal laid down in the Harvard speech of 5 June 1947 was a great act in American statesmanship, great in concept, tremendous in the results which go on to this day—as Marshall's power of looking far into the future told him they would. Already the nation's satisfaction with Allied victory over Germany and Japan was beginning to fade. Already it was becoming apparent to reluctant minds that once more we had "won the war and lost the peace," if one may exaggerate. Already a wartime ally in the Far East was deep in trouble which in a few years would begin hurting us severely; in eastern Europe a much greater wartime ally was openly breaking agreements and engulfing little nations it had promised to respect, and its savage effort to block the West from Berlin was on the way; in western and southern Europe and in the Orient free nations friendly to America were staggering from weakness and anxiety. The collapse of much of the free world was unmistakably threatened.

In this time of near-despair Marshall's speech sounded like a trumpet, arousing nations which were fainting, warning off aggression, and, not least, stimulating in America itself a new pride in responsibility which is the beginning of action. Of all the visions of future which Marshall had seen, and acted upon, this was the greatest. It sprang partly from his intellectual powers, partly from his profound sympathy for men and nations suffering from no fault of their own, partly from that noble generosity of spirit which is man's noblest attribute. It recognized the need of saving free men from political as well as economic ruin. Not least, it recognized that America itself, rich in resources, less hurt by war than our allies, fat from self-indulgence, itself needed something beyond security and luxury; its own moral powers needed the strengthening which comes from sacrifice; its powers of leadership called in clarion tones for exercise of leadership. That sacrifice of a sort in strengthening allies would ultimately strengthen American defenses too was clear enough to Marshall, and often so stated in order to spur American effort, and amply proved by the stiffening which the free world received that year and kept receiving. But the man who knows Marshall knows that this was only a part of his expectation.

The Harvard speech came as a bolt from the blue only to the outer world; it was the fruit of long thinking and consultation with advisers; the

concept had many times been tried out in advance, as wartime weapons and tactics had been tried out many times, to test their suitability for purpose and their precision and durability and field reliability, so to speak. The speech at Princeton earlier in 1947 had tried out on a fairly larger audience a few aspects of the Plan, although few who then heard it or read it knew how earnest was Marshall or how far those ideas would reach in the ultimate application. To this day there are not many who associated what they then read with what burst upon the world in the following June.

### HE CAME FROM THE ARMY

But—as a suggestion of the power to take a very far look into the future which Marshall possessed—one can with profit look back still farther, to 18 November 1945. Marshall, his long tour as Chief of Staff finished, looking forward, half happily, half regretfully, to a peaceful retirement, was in the courtyard of the Pentagon. So were thousands of others, his old friends of the armed services, countless military and civilian subordinates and acquaintances. So was President Truman, deeply moved as on that day he pinned on his adored friend the Distinguished Service Medal. So were the Secretaries of State, War, Navy. To them, and to the nation, and pointedly to the soldiers he had so competently commanded, Marshall made an address of which this is an excerpt:

"Today this nation, with good faith and sincerity, I am certain, desires to take the lead in the measures necessary to avoid another world catastrophe such as you have just endured. And the world of suffering peoples looks to us for just such leadership. Their thoughts, however, are not concentrated alone on this problem; they have more immediate and terribly pressing concerns—where their next mouthful of food will come from, where they will find shelter tonight, and where they will find warmth from the cold of winter. Along with the great problem of maintaining the peace, we must solve the problem of the pittance of food, of clothing, of coal and homes. Neither of these problems can be solved alone."

The germ of the Marshall Plan is there clearly visible. Looking back on November 1945, the astonishing thing is that, hearing those words, we did not more quickly respond. The sure thing is that Marshall saw what the rest of us as a nation did not discern; and that, seeing it by his own wisdom and foresight and humanity, he worked on that basic idea until he was strong enough in national non-military affairs to present it fully and forcefully in 1947, when the rest of us, too, were wise enough to recognize what Marshall had seen long before. And the proud thing, for the Army, is to remember that this man came from the professional Army.



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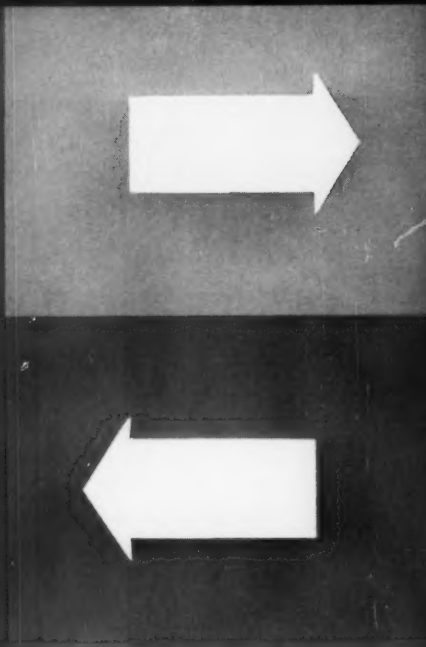
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# PARTISAN TACTICS— ALGERIAN STYLE

PETER BRAESTRUP

**S**INCE 1 November 1954, the French Army has been embroiled in a war to suppress the Algerian rebel "National Liberation Front" (FLN), a cruel war of mutual terrorism, partisan tactics, and subversion in a mountainous, poverty-racked land nearly three times the size of Texas.

By early 1960, the French, largely withdrawing from other commitments, had slowly increased their Algeria forces from 50,000 to 500,000—draftees, reservists, paratroopers, the famed Foreign Legion. From *quadrillage* (local garrisons), the French had broadened their strategy through 1957-60 to include blocking off the rebels' vital supply "sanctuaries" in Tunisia and Morocco with heavily fortified lines; enlisting more than 100,000 Moslems as auxiliary troops; regrouping thousands of outlying villagers—potential rebel supporters—into "protected areas" using garrison troops on projects designed to attract Moslems to France; employing some 50,000 mobile reserves, mostly Legionnaires and *paras*, together with helicopters, close-support aircraft, and artillery, in repeated "comb-outs" of rebel-infested areas.

Despite some considerable successes, notably the 1957 clean-up of Algiers and the reported semi-pacification of parts of western Algeria, the French failed to score decisively. And even as the French inflicted heavy losses, their own sacrifices were not trifling. By late 1959, the Army's announced dead totaled 13,000. Far greater civilian losses, both Moslem and European, continued to occur. France's failure to solve the Algerian "problem" led directly to the Fourth Republic's fall in May 1958. For the Fifth Republic, the headache remains.

The military problem, in large measure, is to subdue an estimated 30,000 uniformed rebel regular troops, plus perhaps 100,000 irregulars (precise figures are impossible to find). These forces dominate most of rural Algeria outside the French-held towns, especially the Aures-Nemencha Mountains and Kabylia, east of Algiers. Financed heavily by the Arab League, but with its own "external" organization and a grass-roots internal network for sabotage, taxation, and propaganda among Algeria's nine million Moslems, the National Liberation Front has not only survived but, as guerrilla movements go, prospered in five years of war.

FLN tactics and organization, in an era of nationalist uprisings and limited war, seem worthy of study in the U. S. The article that follows is based on my own continuing research and interviews with veterans of both sides, as well as observations as a reporter with the rebel forces in Algeria and Tunisia during September 1958.

Garrison forces engaged in desultory patrolling between strong points can't cope with an aggressive and tenacious rebel movement that has refined hit-and-run tactics, subversion and terror into a political-military system





**A**t a tin-roofed mud hut, just inside the Tunisian frontier, a half dozen officers and noncommissioned officers of the Algerian rebel 6th Battalion, Base de l'Est, were making ready to lead a typical night action against the French across the border in Algeria.

Shortly before 1800, a small, moustached, immensely professional *sergeant-chef* appeared. He carried a notebook, pencils, and binoculars. Nicknamed "The Mexican", he was chief of the Battalion's mortar section. Behind him came three chestnut mules and a dozen men in olive drab. Stashed away in the mud hut were the base plate, tripod, and tube of a World War II German 81mm mortar, plus battered metal cases of ammunition.

The Mexican, after much shouting, got his men to load up the three mules with the mortar components. They were taking 18 rounds for a mortar shoot of the 150-man French outpost at El Hamed, some 14 kilometers to the south and west. Also on hand would be a rifle company, split into sections, from the 6th Battalion, green replacements trained in Tunisia, with veteran sergeants, out for their first taste of war.

The mission: to harass El Hamed and, possibly, to provoke the French garrison into sending out a retaliatory force that could be ambushed. No direct assault over minefields and barbed wire against the bunkers and trenches of El Hamed was contemplated. The Algerians preferred, understandably, to catch the French in the open.

Convoing the mule-borne mortar was a 35-man rifle section and a small headquarters group. The rest of the company would precede us to the El Hamed area.

Just at twilight, the Mexican gave the word, and the little column moved out in single file across the pine-studded ridge to the southwest. Soon we were on a winding, French-built road that marks the Algerian side of the border valley.

Well spaced out, but, as usual, without flankers, and with the infantry section well forward, the column moved swiftly along the road under a slightly overcast night sky. The muleskinners cut occasionally at their charges with switches, growling "*Hrrh! Hrrh!*" ("Get a move on!"); the hoofs of the mules and the one officer's horse clopped loudly. Even the sneakers of the troopers crunched on the crushed rock of the road. It was hard to believe that the French did not patrol this obvious approach to El Hamed. Perhaps it was just too easy for the Algerians, as their officers said, to ambush the patrollers. The road, they added, was rarely used by the French even during daylight.

After three hours' march, we halted. Low whistles were heard. Shadowy forms appeared at

the roadside. Linking up with the rest of the attack force, we were close to El Hamed.

Only a few kilometers to the east was the Tunisian sanctuary. Immediately to the south and west loomed the high dark outlines of the Algerian hills, silhouetted by the glow of El Hamed's searchlights. These, presumably, were alight to spot rebels and to guide friendly aircraft, and, in an emergency, relief columns.

An occasional, distant *crump* served notice that French artillerymen to the west were apparently relieving their nerves, if not the national budget, by spraying the countryside with 105mm harassment and interdiction fires.

During the halt, while the rebel troopers broke out canteens, a couple of political commissars began distributing crude red-and-green mimeographed broadsides along the road. INDEPENDENCE OR DEATH, they read in French and Arabic; THE WAR IS APPROACHING ITS CLIMAX. True to rebel doctrine, the mules had brought propaganda as well as mortar rounds.

Moving on, we halted once more, in the lee of a steep, rocky, lightly wooded slope that rose some 300 feet into the night above us. El Hamed was less than 2,000 meters away. Amid animated discussion—loud enough, it seemed, to rouse even the sleepest Frenchman in El Hamed—the Mexican's mortar crew unstrapped their gear. The mules were led into a nearby gully, and we began the ascent of the hill.

That hill was a killer. A goat-legged young infantry lieutenant led the way up the zigzag, contour-jumping path. The mortar crew wrestled its heavy weapon and ammunition into a position just below the flat, pine-topped crest, and the protecting infantry section quietly spread out under the trees on each side. Other rifle sections were deployed on the hill's flanks.

#### MAKING YOURSELF A TARGET

The exuberant Mexican hastened to the forward slope for a look at the target. With him, we gazed down into a shallow valley, slightly hazed over, but illuminated by El Hamed's lights. Garri-soned, according to the Mexican, by the 8th Company, 153d Light Infantry Regiment, El Hamed was clearly demarcated by two brilliant searchlights sweeping lazily skyward as well as toward the surrounding hills. All the Mexican had to do, as he had already done, was to line up the mortar with the lights, and adjust for the range.

"There it is!" he exclaimed, adding optimistically, "Now we shall destroy them."

He shouted the range—900 meters—and the mortar crew, partly illuminated by a flashlight, noisily thunked out the first round. A familiar *whoosh* went up into the sky over our heads, and



DICKEY CHAPELLE

*In a rocky hillside retreat a FLN patrol leader queries a native of the area about French dispositions*

after what seemed a long wait, we heard a dim crash as the round landed. The Mexican peered down at the cluster of lights in El Hamed, and lengthened the range. Another round pooped out and crashed.

After ushering us back to the reverse slope, the Mexican stayed on the crest, shouting orders. The mortar crew worked smoothly—even when one round failed to fire and they had to up-end the tube.

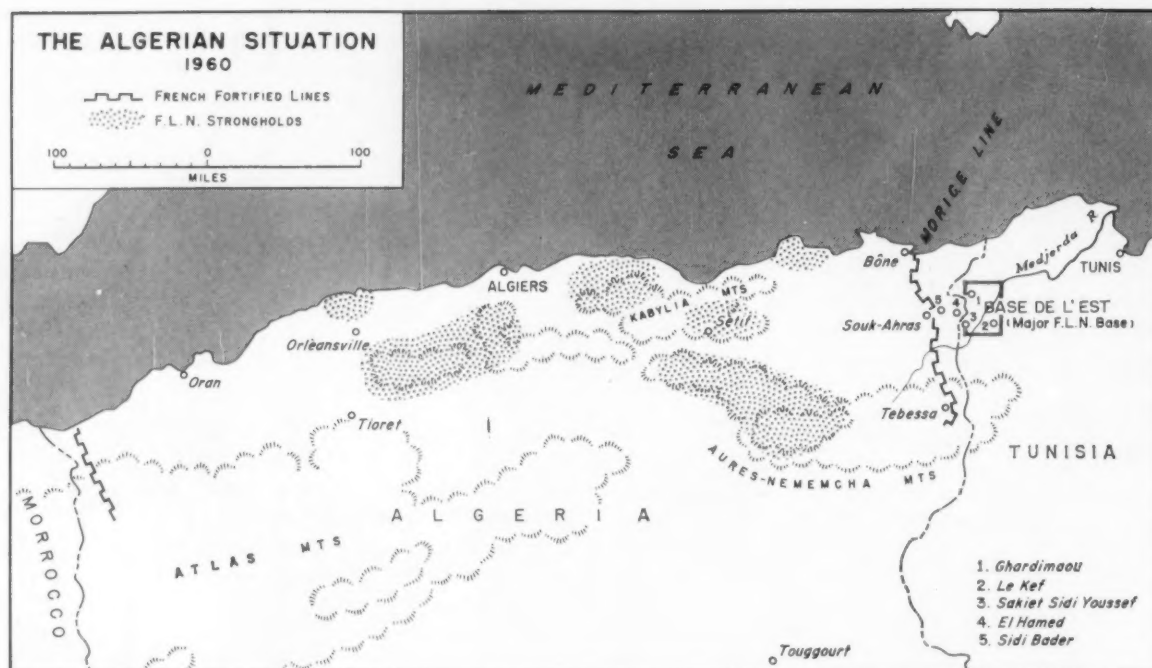
Five or six minutes after the Mexican's first shell landed on El Hamed, the French reacted. A half-dozen rounds of 105mm, fired from a battery well to the west, landed on the next hill to our right, perhaps 2,000 yards away. The French counter-battery target was a mortar site which had been used by the rebels against El Hamed several months earlier. Apparently the French were relying on intuition rather than forward observers. At any rate, while the Mexican's help-

ers slowly popped out their 18 rounds, the French 105s continued to eviscerate the wrong hill.

All his ammo expended, the Mexican passed the word to the infantry leaders, who gave orders to move out, on the double. The mortar crew quickly dismantled their weapon; and everyone slid down the slope, scrambling, sliding, catching on the bushes to slow the mad descent. The noncoms hoarsely urged their young riflemen to move faster—"Allez! Allez!"

When the bulk of the rebels were more than halfway down the hill, the French in El Hamed finally caught on. The next rounds of 105mm smashed into the rocks and pine trees on the crest we had just vacated. The big shells continued to slam the ridgetop as the rebels streamed over the road, across a stubbled field, and into cover in a deep dry creek bed.

The young riflemen showed no panic. None was left behind. In the new moonlight, with the



shells crashing and flaring on the hilltop behind them, most of the greenhorns looked quite elated, if anything, despite the obvious dangers of the exposed withdrawal.

### NO FRENCH PURSUIT

The French did not seem inclined to pursue the matter. They did not box in the mortar site—although they must have known that the rebels did not risk their precious mortars without considerable infantry protection. Nor did they lift the range. Had the French done so, rebel losses might have been heavy. Instead, however, the French soon ceased fire.

The rebel column, rejoined by its mule train and by the covering units, quick-marched northward, following the creek bed under a full clear moon. Bren gunners covered the withdrawal; two- and three-man units met the column along the route, assuring that the way to Tunisia was open. There was no unfriendly interference.

Next morning, a post script to the El Hamed affair further accentuated the impression of French garrison caution.

The Mexican had stayed behind on a hill near his mortar site to observe the reactions of the El Hamed Frenchmen. He was sure that he had scored some solid hits. At 0830 he saw coming slowly down the road from El Hamed two jeeps, a halftrack, and a truck. All were mounting machine guns, and were loaded with troops. The lead jeep bore several Moslems in the French Army. "Traitors," the Mexican called them. They got out of the jeep and swept the road with mine

detectors. They carefully gathered up the propaganda throwaways left by the rebels the night before. Then, at extreme range, the Mexican opened up with his bolt-action Mauser.

He cranked off some 30 rounds. Without returning fire, the French hastily turned tail and scooted out of sight in the direction of El Hamed. Shortly thereafter, the Mexican's hill was subjected to a half hour of slow bombardment by 105mm howitzers. The Mexican, unscathed, turned up at a rebel post in Tunisia a few hours later, obviously delighted by the morning events: "That is a lot of money to waste shooting at one Algerian."

How has the rebel Army of National Liberation (ALN) managed to survive on the ground against western Europe's largest land army?

### REBEL ORGANIZATION AND TACTICS

French internal military and political problems and, importantly, outside Arab League financial and political support have helped sustain the rebel cause. Bases in the Tunisian and Moroccan sanctuaries obviously are crucial. Historically, Algeria's size and rugged terrain have encouraged rebellion. But, in large measure, the military answer lies in the doctrine, organization, and tactical effectiveness of the ALN.

With Marshal Tito's successful World War II partisan movement in Yugoslavia as one of their avowed models, the rebel leaders emphasize the dual military-political role of their army, with priority given to the political over the military, and to the "internal" organization over the external. The rebels' "collective leadership" in Tun-



isia—the Algerian Provisional Government—is officially headed by Ferhat Abbas, a veteran nationalist politician-lawyer; his cabinet, mostly French-educated, includes the powerful Belkacem Krim, hard-bitten combat veteran and Minister of War.

The tactical decisions are made by the ALN's seven regional commanders, each a colonel, who also have plenty to say on over-all strategy and logistics. They head six *willayas* (regions) within Algeria, and the crucial Base de l'Est (East Base) comprising western Tunisia and the eastern Algeria border area. Each *willaya*, in turn, is divided into districts, subdistricts, and sectors, with the corresponding TOE units of battalion (600 men), company (150 men), section (35 men).

Each unit commander is considered a political-military representative of the National Liberation Front's central authority. He has three officer or sergeant deputies responsible, respectively, for military activity, political action, and intelligence and liaison. The political commissars also raise taxes and food supplies from the Moslems and seek to rally Moslems to the FLN.

Most small-unit leaders in the ALN come up through the ranks, but in its transition from a loose, squabbling confederation of guerrilla bands into a Tito or Viet-minh style partisan movement, the rebels had to revamp much of their early leadership. The original guerrilla chieftains won their spurs as tough, daring individual fighters; under the emerging political-military TOE many of these men proved unable to command others, and had to be replaced, often over their followers' protests. The interior organizations experienced wholesale purges, by French accounts. "Little by little," said Abdel Kader, a top rebel political commissar, "we are creating a nucleus."

### HIS RIFLE IS HIS LIFE

Most recruits are under twenty (like half Algeria's Moslem population), drawn from the tough, poverty-stricken Moslem peasantry. Volunteers are plentiful. They join for the excitement, to escape French police action at home, or to fight for "independence" and first-class citizenship. "We are fighting a twentieth century war with a sixteenth century people," observed one staff officer. "A young peasant lad who joins up has to learn to obey. A uniform is not enough. He says 'I joined my brothers to fight for independence. Why do I have to go here and there?' We give him a rifle, saying, this is your life. Keep it clean. It is hard to make him understand."

In the *willayas*, most recruit training is on-the-job. In the East Base sanctuary in Tunisia, sheltering some 15,000 rebel troops, the rebel army operates regular training camps (*Ecoles des Cadres*) for recruits and noncoms. Since early

1958, there have been reliable reports of schools elsewhere in Tunisia for armorers, radio operators, and demolitionists; of pilots training in Egypt; and of cadres training in the Eastern European satellites.

East Base recruit training, under the supervision of Algerian veterans of the French Army in World War II and Indochina, consists mostly of small-arms handling, partisan tactics, first aid, plenty of hiking, and enough French-fashion close-order drill to accustom the recruits to taking orders. Training may last up to three months.

Each training unit, inevitably, has its semi-educated commissar, charged with indoctrinating the troops with FLN propaganda. Here, as elsewhere, the rebels paid great attention to leaflet passing, political bull sessions among the troops, and distribution of the rebel newspaper *El Moujahid* ("Freedom Fighter").

It should be noted that the ideological spur to the ALN is "independence," not communism. While most of the political commissars I encountered expressed bitter dislike for "Western colonialism" and somewhat cloudy admiration for Karl Marx, they had no use for the Soviets or Communists as such. They admired the Viet-minh—for Dienbienphu. Some rebel spokesmen claimed, indeed, that Communists were shot by the ALN where found. Not even the French Army has persisted in its early claims that the rebels were agents of the Kremlin.

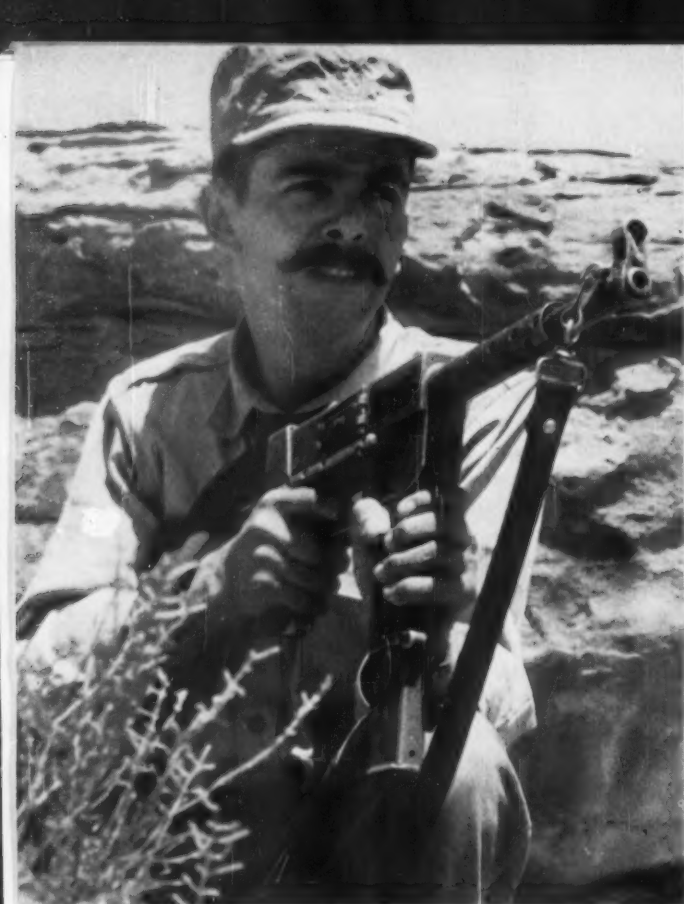
### LEAN AND MEAN FIGHTERS

Essentially, the Algerian troopers viewed themselves as Algerians first, "Arabs" second. Despite Radio Cairo, they were generally (and ungratefully) scornful of Nasser and the military pretensions of the Arab League. Some even regarded Israel with some respect—for its Sinai victory. Amid the general resentment against the U. S. for supplying the French in the past with money and military equipment, there was also the image of the U. S. as a friend to such new Moslem nations as Tunisia and Pakistan.

Officers and men alike lived under stringent rules. They were forbidden women and alcohol. Some of the East Base troops had wives and children in Tunis; visits were forbidden. Only the badly wounded went to the rear. A private's pay was three dollars a month; dependents, theoretically, got a little more. There was no Universal Code of Military Justice. Disobedience, desertion, a hint of disloyalty, meant death.

This austerity made for a taut ship. Yet morale seemed high—a kind of hard, confident fatalism. Saluting in the field may have been ragged, but I never saw an order not obeyed with alacrity. Among line soldiers there was some disdain for the "politicians back in Tunis," but in the field





DICKEY CHAPELLE

*Mustached machine gunner poses as a rebel with a cause*

the commissars played a discreet role. Marksmanship and fire discipline, as viewed at impromptu target practices, seemed up to U. S. recruit standards. The ALN was a soldierly looking army.

Just at sunset one day, I watched the veteran 3rd Battalion, East Base, getting ready to sally forth from Tunisia. It was like a scene from the Civil War.

The regulars stood at ease, two companies strong, on the reverse slope of a low, irregular scrubby ridge. They were gathered by 35-man sections, each behind its German MG42 LMG or Bren gun. They were in the bulgy, wrinkled, heavy olive drab of the regular ALN, with British water bottles, U. S. cartridge belts, and bandoleers. Slung from their shoulders were Lee-Enfields and Mausers (sent from Egypt) or, more rarely, a captured Garand or French MAS semi-automatic rifle. In their felt visored caps, their pantaloons, and sneakers, they reminded one of the Chinese Communist troopers in Korea. But the tough faces were as varied as the many races that mingle in Algeria. Various, they looked Italian, Puerto Rican, Chinese, Turkish, or Cherokee. They talked quietly among themselves, calm and cheerful. Two or three troopers were off in the scrub to one side, bareheaded, on their knees

in the bushes, facing Mecca in their sunset devotions.

On a small knoll, indifferent to the threat of French aviation, were grouped the bareheaded battalion staff and its commander, a tall grave Lincolnesque captain in his late thirties. He wore a Luger and carried French artillery binoculars.

Action, he said, had not been heavy in this area. The previous night, in a typical action, a half-dozen 3rd Battalion troopers had probed a French outpost to the northwest. Apparently, said the captain, the French CO was convinced that a major attack was in progress. The probes drew two hours of artillery fire, and, by the light of flares, the attentions of French aircraft. The two-hour embroglio left the rebels—and, presumably, the French—unscathed, but the French lost a night's sleep and a couple of thousand dollars' worth of ammunition and aviation fuel.

These 3rd Battalion troopers and others in the Army that we saw, operated on a shoestring.

## REBEL WEAPONS AND RATIONS

Cleaning materials for the standard weapons we have mentioned were scarce. Rebel doctrine on conserving ammunition was strict; it stressed recovery during combat of the weapons of the dead—both friendly and French. Especially in the interior *willayas*, ammunition and weapons resupply was a major problem.

As heavy weapons, the rebels relied on the above-mentioned German 81mm mortar, perhaps one or two per battalion. A few captured heavy machine guns were reported. During late 1958 there were propaganda photos of 20mm Bofors cannon, bazookas and recoilless rifles, but I saw none of these in action. The French reported some U. S. 57mm recoilless rifles in the East Base area after 1958.

Antitank mines (German) and bangalore torpedoes (from Egypt) seemed plentiful. Composition 3—*plastique*—was a favorite for sabotage. Stocks of hand grenades (French and English makes) were short. The mine, the automatic weapon, the rifle, and the mortar remained the basic ALN weapons, used sparingly.

On the whole, the rebel diet was austere: unleavened bread, peppers, coffee, *cous-cous* (a kind of rugged Wheatena), more rarely mutton, rice, and goat's milk.

Medical care was (and is) at best skimpy. The company aidman carried only the barest essentials. The badly wounded, when they could be brought out at all, were forced to travel on muleback without benefit of morphine, antibiotics, or proper bandages. In the Base de l'Est area, the survivors could expect hospital care at Le Kef in Tunisia; for the wounded in the interior, the prospects were less certain.

## COMMUNICATIONS SLOW AND INADEQUATE

Communications has constituted another headache for the rebels. At a 3rd Battalion farmhouse CP near Sakiet Sidi Youssef in Tunisia, we spotted a Canadian radio set comparable in size and appearance to those we remembered at battalion CPs in Korea. Since early 1959, both rebel Headquarters in Tunisia and interior *willayas* use new German Telefunken radios, but in units below *willaya* and battalion, communication is by runner.

Slow communications put scattered rebel units, once a planned operation has begun, strictly on their own. Thus each ALN operation tends to be a set-piece affair, of limited duration, with limited objectives. Prior to one scheduled 6th Battalion attack, a staff officer explained the plan:

"Tonight there will be night attacks. The French will be drinking tonight [Saturday night], and when they are full of wine, we attack. From long experience, the Army knows where the French artillery concentrations are. They know the routes by which the French will send relief columns to their outposts. Each [rebel] unit knows its role. To isolate the outpost, to ambush the reenforcing columns, to make diversions. Everything is arranged."

But as it turned out, the situation changed. The French increased their activity in the 6th Battalion area during the next few hours (just prior to the September 1958 referendum in Algeria); and the rebel plan was abandoned. It could not swiftly be modified. No major "offensive" occurred.

## HIT-AND-RUN TACTICS

As it affects the flexibility and duration of major rebel operations, so does the communications problem help to limit the strength which can be deployed against a single objective. For this and other reasons, seldom do rebel forces strike in more than company strength. On the other hand, to protect arms-carrying mule trains or to divert French units from the real objective, several companies have, on occasion, launched simultaneous attacks or probes at scattered points.

Most forbidding, of course, to larger concentrations and sustained "offensives" by the ALN is the French ability to counter rapidly in daylight with rocket-firing aircraft, artillery, and mobile reserves, once rebel positions are known.

Hence, the rebels, realistically, concentrate on hit-and-run tactics, the traditional small unit tactics of partisan warfare. When they have deliberately broken this rule—notably in major battalion-size thrusts through the newly built Morice Line in the winter of 1957-58—they have suffered severely; the lesson has been learned.

The "mosquito war" is favored by the rebels, especially against the shifting fringes of French strength. This is above all a night war, or a bad-weather war, when French tank and aircraft effectiveness is lowest. Each week, as many as 25 ambushes and 20 attacks on French units, convoys, and outposts are reported by the rebels across Algeria, in addition to countless unreported acts of sabotage and terror.

In every operation, the Algerians enjoy a basic advantage: their seemingly omnipresent civilian auxiliaries, who serve as "human radar," scouts, intelligence agents, and guides. These *moussebel-line* infiltrate French-held villages, prowl the terrain ahead of regular ALN columns, and despite vigorous, if haphazard, French countermeasures, provide a constant stream of "hot" information to the ALN. As a result, French troops rarely achieve total surprise.



DICKEY CHAPELLE

*Medicine for the kids creates parents with an obligation to the rebel cause.*

On one occasion, holed up on a mountainside near the Medjerda River, with a French armored column on the far side, I asked two *moussebelline* if they could get cigarettes. They not only brought back some passable French Gitanes—purchased in a French-occupied village—but also the unit designations of the French armor.

One of the principal keys to ALN survival is the impressive march endurance. ALN units are always on the move. Thirty to 40 miles in 24 hours over mountain paths is not considered arduous. The soldier carries a rifle, 100 rounds of ammunition, a full canteen, a blanket, and three pounds of bread. He doesn't bunch up, and when exposed in the open to aircraft he lowers his head and stands motionless until the aircraft drones away.

Whether on the march or in bivouac, rebel troopers prefer the high ground, just below the crest. If the ridges are bare (many of them have been burned off by French napalm) and daylight marching is required, the rebel leader will take his men into the heavily wooded draws and deep creek beds. While scouts and liaison units may precede a moving column by hours or days to the next bivouac for security, the column itself will depend on speed rather than flankers.

Ambush tactics vary with the type of target and the proximity of French supporting units.



DICKEY CHAPELLE

*Rebel rifleman—give him soft shoes for stealth, 100 rounds of ammo, canteen of water, blanket and three pounds of bread and he's in business*

Most ambushes are squad-sized shoot-and-run actions, some are a kind of temporary roadblock, a few have involved whole companies of rebel troops and bloody retaliation by French aircraft, artillery, and mobile battalions.

One technique is to place a string of mines across an exposed French supply route, where the road passes through a defile or skirts a ridge nose. Scouts or *moussebelline* warn of the expected convoy's approach. When the lead vehicle

hits the mine belt—or when the French point's mine detectors spot the mines and the convoy halts—the rebels open from both sides with automatic weapons and grenades as well as with enfilade fire down the road.

Then, if possible, one group of ambushers seeks to close with the survivors in the halted vehicles. Object: to grab weapons as well as to further confuse and destroy the enemy even at the risk of heavier friendly losses.

## SPEED AND SHOCK

The accent is on speed and shock action. French armored escorts are attacked with Molotov cocktails or grenades, blinded with smoke, or deliberately blocked off by burning vehicles in the convoy. Vehicle-mounted machine guns are turned against the enemy. As soon as the French begin to rally, the rebels break off action, and, under cover of pre-arranged automatic weapons fire, the ambushers scatter with their casualties, prisoners, and booty, later to reunite. Seldom is a French convoy "annihilated"; but the rebels' success have forced the French Army to divert increasingly larger forces to protect its communications. Even so, losses continue.

Attacks on exposed garrisons—farmhouses, villages, iron mines, railheads, outposts—usually take the form of night or bad weather probes, mortar bombardment (such as the El Hamed affair), sniping, or, far more rarely, direct assaults and raids in company or section strength.

Using the lowest possible number of men, a stealthy close-in approach, and surprise and diversion are prime pre-assault elements of rebel attacks against outposts. Leading the way through the mine barrier, pathfinders with wire-cutters take care of the first aprons of barbed wire. Bangalores blow the final gaps. Simultaneously, the assault units rise, firing from the hip, and go in yelling, heedless of casualties. Unit leaders, including company commanders, join in the fire fight. They rely on the night assault's shock effect to hold down losses. Once a breach has been made, the rebels don't back off easily.

Sometimes mortars are used to reduce a die-hard bunker, once the bulk of the garrison has been subdued. In the rapid mop-up, weapons are recovered, ammunition collected, and prisoners, if any, are shepherded to the rear. "Sometimes," said a rebel officer, "the prisoners don't want to keep up with us during the withdrawal, and we have to shoot them. The French shoot our people, so why not?" Some prisoners, however, are kept alive. The FLN has exploited French prisoners, and particularly, for propaganda, German and Italian deserters from the Foreign Legion.

Unless trapped, seldom does the ALN try to make a stand or hold ground. Sometimes, a



squad or section may be expended to delay a French sweep so that larger units can escape. However, the usual reaction to a major mountain comb-out (*ratissage*), which may involve several French regiments, is to avoid contact and seek safer ground. The accent is on living to fight another day, not on becoming fixed as a target for French aircraft, artillery, and the hard-worked Legion. As a result, most of the French Army's more massive punches land on air.

Realizing that its effectiveness lies as much in the mere fact of its existence as in any damage it inflicts on the French, the Army of National Liberation or its propagandists may talk of "offensives" and "Dienbienphus," but in practice seldom expends its slender material resources unless the rewards seem exceptionally promising. By choice and necessity, rebel tactics are opportunistic—pinpricks that harass rather than hammer blows that cripple.

### ASSAULTS ON THE MORICE LINE

Against the Morice Line, however, the rebels would like to have a hammer-blow capability.

Named after a former French Defense Minister, the Morice Line was completed in 1957 to block off the interior rebel *willayas* from the ALN supply dumps, training camps, and headquarters in "neutral" western Tunisia. Over the rugged terrain, the line runs roughly from Bône, on the Mediterranean, to Souk Ahras, guarding the Medjerda River corridor, to a point south of Tebessa at the Sahara's fringe. Total length is more than 100 miles. A similar line, facing the Moroccan frontier, was built earlier.

By rebel accounts, the Morice Line consists, through much of its length, of three parallel barbed-wire barriers. One barrier is electrified, all three are larded with minefields and backed up by patrols, artillery, and aircraft. Strongpoints are located at intervals of 2,000 to 3,000 yards. A road for armored car patrols and motorized units links the strongpoints. Radar is used to detect rebel approaches by night. It is reported that some 25,000 to 40,000 French troops garrison the line and its vicinity.

The mountainous approaches from Tunisia to the Morice Line constitute a No Man's Land, a dark and bloody ground, 15 to 35 miles across. Here, despite the abandonment of many small platoon-size positions, the French still maintained (in 1958) some two dozen isolated outposts in a style resembling that of Indochina days. Some were occupied by two companies of infantry with 105mm howitzers. These posts served as bases for French "Special Administrative Service" units in their social-political work among the remaining Moslem villagers. They serve as observation points, as centers for intelligence and counter-

intelligence activity. Prior to the 1958 referendum, the garrisons of these posts canvassed the local peasants and ordered them to vote.

One such post which had been recently abandoned when I saw it, was the fortified railway station at Sidi Bader on the Medjerda River, a few miles east of Souk Ahras. Sidi Bader consisted of an old-fashioned two-story station, a couple of sheds and outbuildings, sandbagged emplacements, a 15-foot-wide barbed-wire apron, and a belt of mines (unremoved). Once a shipping point for wheat, the outpost had been garrisoned, according to our ALN guides, by a half-



DICKEY CHAPELLE

*Don't discount the propaganda value of pictures posed to show an eagerness to use cold steel*

company of infantry. Nearby was a small native village. Within mortar range of the ridges dominating the Medjerda Valley, and with the river bed and railroad embankment easy avenues of approach, Sidi Bader was less than ideal as an outpost.

However, the outposts, coupled with daily aerial reconnaissance, did put something of a crimp in rebel efforts to penetrate the Morice Line. They contested, however passively, complete rebel dominance of No Man's Land and its





DICKEY CHAPELLE

*Respite from combat: let your bare feet bask in the hot sunlight while you concentrate on a game of chess*

Moslem populace. By guarding the easiest approach routes, the outposts forced the rebel supply trains to take the more difficult, more circuitous paths. And, supplied by weekly armored convoys, the much-harassed outposts could provide supporting fires, blocking positions, and bases to assist mobile forces in their occasional counter-drives against the rebels.

Rebel tactics in breaching the barrier, usually after a zigzag approach march from Tunisia lasting several nights, followed the normal ALN pattern: diversionary night attacks, stealth, speed. Long-handled rakes are used to feel the way through the mines; rubber gloves are worn while handling the electrified wire. Having blown the wire with bangalores, it is imperative to rush the mule-borne supplies through the gap to the hills beyond before the French react in force. Delay is fatal.

Understandably, rebel (and French) losses have not been light in Morice Line operations. In the winter of 1957-58, the East Base command ran whole companies of Algerian riflemen through the line, each man carrying 600 rounds and an extra weapon to leave behind with the interior forces. Through 1958-60, the French gradually beefed up the line and made rebel breaches far more difficult. Indeed, in late 1958, several authoritative rebel sources stated that they knew of no major breakthroughs since the previous March.

The rebels, however, later claimed additional successful, if costly, breaks, including several in late 1959 and early 1960.

The rebels' alternative supply routes are risky. The end run across the desert south of Tebessa is totally impractical save during the rainy winter months, when French aerial reconnaissance and water shortages become less pressing.

Attempts to land supplies by sea along Algeria's 650 miles of rocky coastline have been inhibited (but not eliminated) by French Navy patrols and the crust of French garrisons in the more heavily populated coastal zone. The Algerians prefer the costly breakthroughs from Tunisia, since the terrain immediately beyond the Morice Line is largely under rebel control.

Even as the rebel regular army kept up its mosquito war against the Morice Line and the French forces in the field, so did the rebel irregular commandos exert terrorist pressure in towns.

Commando Slimane, in the East Base area, was named after its leader, Slimane Genoun, a 26-year-old black marketeer and arc welder from Souk Ahras. Slimane had a price on his head, after walking into the central plaza of French-occupied Souk Ahras in broad daylight and emptying a concealed Sten gun at the midday crowd of French soldiers and civilians. He escaped unscathed in the bloody confusion that followed.

With their own comfortable hideout in Tunisia and their own blue denim garb, Slimane's "Commandos of Death" were loosely and reluctantly attached to the regular 3d Battalion. The commandos were city boys: "We go right into the towns and blow up the French; the Army stays out in the countryside." Like their counterparts elsewhere in Algeria, the commandos specialized in minor ambushes, sabotage, assassination. Commando Slimane also specialized in probing the Morice Line. It avoided pitched battles.

#### TACTICS OF A COMMANDO

A small, semi-autonomous band, Slimane's 40 men, aged 15 to 55, enjoyed better rations, lived more easily off the remaining peasantry, and felt little of the ascetic discipline imposed on the ALN. Instead of political tracts, the Commandos read comic books; they had no commissar and needed none. Their personal weapons were comparable to those of the regulars. For ease of control and concealment, Slimane usually split his force on the march. Like the regulars, he kept his automatic weapons well forward (a Bren, an MG42, submachine guns); his two-mule supply train stayed well to the rear. The pace was often a near-run. Once, when a young new recruit began to falter, Slimane bounded up, handed the laggard's rifle and pack to another man, and hissed: "Do not fall behind. The French will

catch you and put a bullet in your neck." The recruit picked up speed.

My experience with Commando Slimane included an approach march toward the Morice Line through No Man's Land—four days of zig-zag and dodge, moving mostly at night, holing up during the day in hillside peasant huts with scouts out and for security the Bren or the MG42 on the nearest high ground.

Peasants showed up with food, water, and information. Some showed the newly healed scars of French "interrogation." At hamlet after hamlet, some within sight of French outposts, the Moslem peasants provided *cous-cous*, lamb, milk, and coffee for the commando. They were friendly, hard-pressed, and scared to death of French retaliation.

### PRESSURE OF FRENCH POWER

As he drew closer to the Morice Line, Slimane also felt the pressure of French power. One day two fighter-bombers, sided by a low-flying Piper spotter plane, gave the commando's hideout a thorough looking over, then bore away to rocket another (empty) slope. Slimane's Bren gunner kept the Piper in his sights, but, following normal rebel policy, held his fire. (The rebels, it should be noted, have downed or damaged enough low-flying propeller-driven aircraft and scarce helicopters to bother French field commanders.)

Several times, Slimane's pickets and the *moussebelline* reported French ground patrols in the vicinity. Once the threat seemed serious enough to justify burying the commando's bangalores and rakes under a convenient haystack. Nevertheless, on another afternoon, Slimane did not hesitate to lead his column—crouching, to be sure—across a saddle in plain view of a French hill outpost a mile or so away. Following this dash, Slimane's troopers relaxed amid the bushes of a deeply cut gorge, listening to the comforting blare of Arab rock-and-roll on Slimane's portable radio, while the predictable French recon aircraft circled blindly in the sky overhead.

After quick-marching through one moonlit night along the Medjerda River and its chewed-up paralleling single railroad track, with great French-set forest fires blazing on the ridges to the north, past ruined railway stations and grain elevators, Commando Slimane reached its final jump-off point. This was a pair of stone huts perched on the reverse slope of a naked ridge high above the Medjerda. Sending out scouting parties and sentries, Slimane and his Headquarters group settled into one hut; his gold-toothed *sergeant-chef* and the others crowded together under their gray blankets in the other.

The Commando was within a dozen kilometers

of Souk Ahras, hedgehog of the Morice Line. The next move, said Slimane, would be to try to reach the line and go through, using the rakes and bangalores borne by his mules.

### ARMOR IN OPEN COUNTRY

The next morning, however, it was plain that the French had sallied forth to stage a major "demonstration."

On the dun-colored ridge crest just across the Medjerda Valley, a mile or so away, could be seen what at first glance looked like a procession of sluggish green beetles. Some were moving, some halted. They were headed eastward, toward Tunisia. A long line of French tanks, trucks, halftracks. The deep, throat-clearing grumble of tank engines was clearly audible.

As his troopers, a trifle tense and fidgety, strap-



PETER BRAESTRUP

*In its mountain retreat Commando Slimane receives its orders from its leader*

ped up their gear, Slimane was barking orders, sending out armed scouts disguised as civilians in loose white turbans and peasant smocks. The MG42 was sent to a wooded hillock above the huts.

Genuine peasants, some with children tagging along, drifted in to report another French column moving eastward to the south of Slimane's position, along the tank roads scraped out by French bulldozers early in the war. Commando Slimane was in the middle of what could become a regiment-size pincers movement.

The danger, as Slimane's *sergeant-chef* (an Indochina veteran) calmly pointed out, would come if the French turned the "demonstration" into a precautionary clean-up and closed the pincers with the full treatment—aircraft, artillery, helicopter-borne *paras*. "If they spot us," he said, "it could be very difficult."

Slimane himself stepped into the hut. "I have forty good men, well-fed, well-trained, well-treated. They are ready to die to the last man." He rubbed his forefingers together. "We are all brothers. All brothers."

The brothers went outside only when in civilian garb, and even then they kept to the available shadows. French motorized units across the Medjerda kept moving sluggishly along their long ridge. Despite its exposed, sunlit position, Commando Slimane was ignored. It would have seemed obvious that French patrols would investigate any habitations left standing on this virtually treeless high ground so close to Souk Ahras and closer still to their "demonstration" force. But they did not. Only two aircraft droned by, high overhead.

In late afternoon, Slimane said, "We are going to try another route tonight." The Commando was in for a long march and some fireworks.

Finally, the bright, hateful, revealing sunlight ebbed and the ridges shaded from sand color to rust to a cold grayish white. French tank engines still growled and grumbled across the valley as Slimane saddled up his troopers.

The Commando cleaned up the huts of all tell-tale evidence. Civilians brought up the mules. Scouts returned. The previously detached half of the Commando showed up for orders and moved out. The others, silent, a little dry in the mouth, snapped on their harness. The *sergeant-chef*, armed with a German MP40 submachine gun and British grenades in leather pouches, checked the troopers. Slimane was everywhere, pushing, ordering, his voice exploding in guttural Arabic. Two youngsters did something wrong; Slimane exploded in rage. He kicked and cuffed them. They both retreated to their hut to weep like children.

### KNOWING THE TERRAIN

As night fell, the bangalores were loaded on the mules, and the column set off, zigzagging downslope to the broad, eroded, brush-dotted floor of the Medjerda Valley.

Split into small groups, Commando Slimane headed right up into the apex of the V created by the French columns. Our group doubled back and forth across the Medjerda in single file. The French are on the high ground? Slimane goes into the low ground.

Seven or eight miles of zigzag marching brought us to a rendezvous. Slimane and his *sergeant-chef* materialized out of the brush. After four years of war, these city boys had come to know their battleground without maps. Nevertheless, the Commando could not find a way through, despite several hours more of marching. Slimane's

scouts discovered that there were just too many Frenchmen in the Medjerda area approaches for a slow moving mule train to penetrate. And, tomorrow, the demonstration might become a clean-up. Slimane decided to pull back.

"One group of mine will be making a little harassing attack [against the French column] tonight," he said. "Another group will cache the explosives. We'll take another way and try again in five or six days."

As this experience seemed to show, the French Army's massive effort was sufficiently strong to preclude any prolonged rebel thrusts, or any full-scale uprisings on the part of the Moslem populace. The French could protect Algeria's 1.2 million Europeans from any major rebel incursions in the towns and cities. The rebels could not seriously interfere with major troop movements.

### STALEMATE FOR BOTH SIDES

Nevertheless, with the bulk of the 500,000-man army tied up in garrisons, the hard-worked mobile forces were insufficient to gain military decision over the elusive rebels. Only the Morice Line, and the periodic "cleanups," limited in time and area, gave rebel forces outside the cities a hard check. Not even the French claim to have "destroyed" any major rebel units.

For the lack of an over-all policy, the Army's "hard" measures (like forcible Moslem regroupment and haphazard repression) ran at cross-purposes with the work of its benevolent Special Administrative Service. Enough bitter Moslems remained, even in the Morice Line approaches, to supply recruits, information, and shelter to the rebels.

The French garrisons, from my observation, seemed relatively timid, despite the obvious rewards of aggressive patrolling and prompt reaction to rebel thrusts. Neither psychologically nor physically did the French Army, as a whole, seem prepared to cope with the rigors and subtleties of partisan warfare.

The rebels, adapting tactics to resources, coupled mosquito war with skillful, if crude, political action. Their cause gained strong emotional staying power among the Moslem masses, a power to which the French have devised no effective answer. The rebels relied on the long pull, militarily and politically. The French long sought, and have repeatedly claimed, imminent military victory.

In short, the Algerian war, thanks partly to France's slow initial reaction, has progressed after more than five years to the point where a purely military solution seems no longer possible. Both sides have arrived at a stalemate. Any breakthrough will have to be achieved at the negotiating tables.



# SOVIET ROCKET WEAPONS

**T**HE free-flight artillery rocket is an effective and potent weapon, and the Soviet Army puts it to greater use than any other army. Since late 1953, it has displayed publicly eight different vehicle-mounted rocket launchers. These weapons range from a 17-tube, 140mm launcher mounted on a truck chassis to a massive, single-round, 840mm launcher mounted on a tank chassis.

The post-World War II introduction of these rocket weapons demonstrates the Soviet Army's continued enthusiasm for an artillery weapon which is looked upon with lesser favor by other armies, and which has had a past history best described as feast or famine. The reason for this enthusiasm is not clear. Perhaps examination of the rocket as an artillery weapon, its role in the Soviet Army, and Soviet tactical doctrine will explain it.

During World War II, every major participant used rockets, each nation developing rocket weapons in answer to its tactical and combat needs. The Soviet Army was credited in 1941 with the first use of rockets during the Second World War. The use of rockets contributed substantially to the successful Soviet defense of Stalingrad. The Soviet Army pioneered in the use of massed banks of multiple rocket launchers for preassault barrages.

Rocket weapons operate under the principle of Newton's Third Law of Motion: for every action there is an equal and opposite reaction. Broadly defined, a rocket is a device propelled by the ejection of material originally contained within itself. In the case of an artillery rocket, the material ejected is gas-produced by the burning of a solid propellant such as double-base smokeless powder. The rocket consists of a warhead and a propulsion unit called the motor. The motor is essentially a metal tube which contains the propellant. It is closed at one end and has one or more openings, nozzles, or vents at the

other. When ignited, the propellant begins to generate large quantities of hot gas. This gas exerts approximately the same outward force on each square inch of the area inside the tube. However, since one end of the tube has one or more nozzles, the gas rushes out through these nozzles without exerting any force on the area of the nozzles, at the same time exerting its full force on the corresponding area at the closed end of the tube. Thus, there is produced a net force or thrust on the motor, acting in the direction away from the open end. It is this reaction force which causes a rocket to fly through the air. It is not the push of escaping gases against the atmosphere.

The greatest single advantage possessed by rockets is the fact that they exert little or no recoil on the structure from which they are launched. Thus, with multiple round launchers a very large total weight of payload may be fired from trucks or other vehicles which could not possibly withstand the recoil forces exerted by equivalent projectiles fired from guns. In rocket fire the momentum given to the projectile is balanced by that of the propellant gases which are mostly dissipated in the atmosphere, while with a gun the supporting structure must be capable of absorbing the entire momentum without damage to itself. A 4.5-inch rocket fired from a launcher with a length of five feet exerts a recoil force of about 930 pounds on the launcher. If, however, the launcher is so arranged that the blast is directed into the open air where its momentum is dissipated, the recoil force on the support structure amounts at most to perhaps one per cent of the figure above. The same projectile fired from a five-foot gun with the same velocity would create a recoil force of about 11,400 pounds, or from ten to a thousand times greater than in the case of rocket fire, depending upon the launcher arrangement.



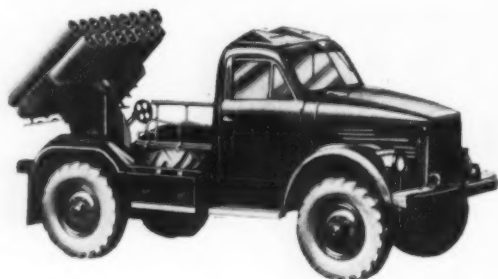


Figure 1. 140mm rocket launcher (17-round) on GAZ-63 truck

Vehicle weight with launcher and rockets	10,000 pounds
Rocket: Maximum range	9,900 yards
Weight (HE)	120 pounds

This medium caliber weapon is the most recent addition to the Soviet Army's family of multiple rocket launchers. It was publicly displayed during the parade in Moscow on 7 November 1959. With its weight of vehicle, launcher and rockets of only 10,000 pounds, this launcher is the lightest and most mobile of the Soviet vehicle-mounted launchers. As such, it would be a replacement for the BM-14 (see Figure 2), or it could be considered a weapon more easily transported across rivers, or even as a new air-transportable weapon. The launching unit consists of 17 tubes arranged in two banks of nine tubes over eight tubes. This weapon is probably manually elevated, traversed, and cross-leveled.



Figure 2. 140mm rocket launcher (16-round) BM-14

Vehicle weight with launcher and rockets	18,000 pounds
Rocket: Maximum range	9,900 yards
Weight (HE)	120 pounds

This launcher made its initial public appearance during the latter part of 1954. It consists of 16 launch tubes arranged in two banks of eight, and is mounted on a chassis of a ZIS/ZIL-151 6x6 cargo truck. During firing, two support jacks lowered from the rear of the truck stabilize the vehicle, and metal shields unfolded from the top of the cab protect windows and cab. This launcher, with its electrically fired, spin-stabilized rocket, is used for area-saturation fire. This is a medium caliber weapon.

This lack of recoil which permits the use of multiple round launchers on relatively light vehicles also gives a high degree of mobility and a very rapid emplacement time. Thus, in both offense and defense, the vehicle-mounted rocket launcher can be quickly moved from dispersal areas to battle lines, and quickly fired. From a manufacturing viewpoint, launchers are much easier and less expensive to produce than conventional artillery.

A less important advantage is the relatively slow acceleration of the rocket as compared to a projectile fired from a gun. More sensitive fuzes can be used, and rocket warheads may have thinner walls. This would apply to the use of chemical warfare agents as the payload. Also, the ratio of length to diameter is greater for rockets than for most shells and is advantageous where penetration of water or earth is desired.

The principal disadvantage is the fact that, in ground fire, free rockets cannot compete in accuracy with that of conventional guns. The mean

deviation in dispersion for ground fire for fin-stabilized rockets is on the order of 20 to 40 mils. (A dispersion of 1 mil at 1,000 yards equals 1 yard; 17.8 mils equals 1 degree.) With spin-stabilized rockets, the dispersion is reduced to 5 mils. In comparison, dispersion for a conventional artillery gun is on the order of 1 mil. This lesser accuracy in ground fire is not important when it is desired to saturate an area target. However, for accurate pinpoint or creeping fire, the rocket is at a disadvantage, thus limiting the role of the rocket as an artillery weapon. Another disadvantage is its range. Four of the six multibarrel launchers of the Soviet Army have ranges of less than 10,000 yards. In comparison, medium and heavy artillery pieces, with exception of the howitzers and mortars, have ranges in excess of 20,000 yards.

Also to be noted is the heavier weight of rockets compared to artillery shells. This heavier weight in conjunction with the rapid consumption of rockets by multibarrel launchers creates a

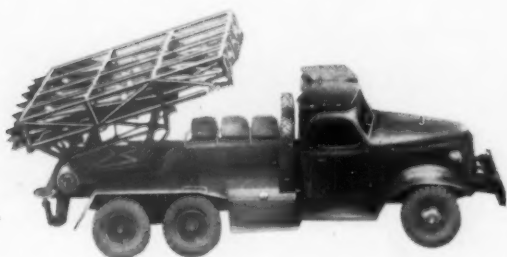


Figure 3. 200mm rocket launcher (4-round) BMD-20

Vehicle weight with launcher and rockets	8.8 short tons
Rocket: Maximum range	20,000 yards
Weight (HE)	428 pounds

First shown in public in 1954, this large caliber launcher is mounted on a ZIS/ZIL-151 cargo truck. It has support jacks for vehicle stabilization, and metal shields for protecting cab windows. The launching unit consists of four rectangular open-crate type launching frames, with spiraled guide rails arranged in a single horizontal bank. One of the rails on the launcher imparts a half-turn initial spin. Each rocket has four fins for flight stabilization. In the base of each rocket are seven small venturis arranged in a rosette pattern.

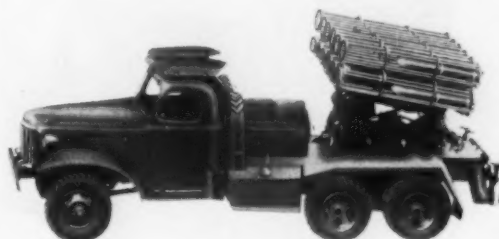


Figure 4. 240mm rocket launcher (12-round) BM-24

Vehicle weight with launcher and rockets	9.9 short tons
Rocket: Maximum range	7,700 yards
Weight (HE)	248 pounds

The BM-24 medium caliber rocket launcher, first displayed in the latter part of 1953, is mounted on the ZIS/ZIL-151 truck. The launcher consists of 12 circular open-crate launching frames arranged in two banks of six frames. Spin is imparted by angled venturis in the base of the rocket. This weapon would be fired for barrage effect.

logistical support problem. The monorail launchers have excellent range, but the weight of the rocket is so great that its role is limited to nuclear warfare. Other disadvantages of the rocket include the hazard and inconvenience of the blast of high-temperature gases, the less effective penetration of hard targets because of the slower velocity of rockets, and the disclosure of firing positions.

The technical advantages listed above, particularly when weighed against the disadvantages, do not appear to provide solid reasons for widespread use of artillery rockets rather than conventional artillery. Given a choice, most artillery men probably would choose, regardless of target, a conventional artillery gun. However, the Soviet Army does place emphasis on the rocket.

The Soviet Army classifies its rockets as medium caliber, large caliber, and long range. Medium caliber rocket artillery is used to neutralize with volley fire enemy personnel and weapons located in the open or protected by light cover.

Large caliber rockets are employed to destroy with volley fire field defensive structures and to destroy concentrations of enemy personnel, weapons, and tanks. Long range rockets are employed to destroy enemy targets within the limits of a tactical zone at ranges of 15 to 35 miles. Rocket warheads employed include high explosive, fragmentation, armor-piercing, incendiary, chemical, or concrete-piercing.

Medium caliber Soviet rockets are the most abundant and are organic to the divisions assigned to the two basic types of Soviet ground armies—the tank army and the combined arms army. In addition, the Soviet ground armies are supported by artillery divisions whose armaments include rocket launchers.

The tank army is armor heavy; that is, composed mostly of tank divisions. Each tank division is equipped with twelve 240mm truck-mounted rocket launchers. Also attached to the tank army are a rocket launcher brigade with about 75 rocket launchers and at least one motor-



Figure 5. 240mm rocket launcher (12-round) on AT-5 tractor

Vehicle weight with launcher and rockets	15 to 17 short tons
Rocket: Maximum range	7,700 yards
Weight (HE)	248 pounds

This multiple rocket launcher mounted on a tracked chassis was first shown during the parade in Moscow in November 1957. The launching unit consists of 12 conventional rocket tubes arranged in two banks of six tubes each. These rockets are believed to be spin-stabilized, spin being imparted by angled venturis in the rocket's base. The AT-5 tracked prime mover is identified by its full track with eight road wheels and four return rollers, and by its snub-nosed eight-passenger cab. This is another medium caliber weapon.

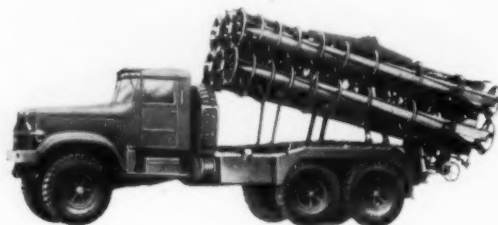


Figure 6. 280mm rocket launcher (6-round) on YaAZ truck

Vehicle weight with launcher and rockets	20 short tons
Rocket: Maximum range	23,500 yards
Weight (HE)	1,000 pounds

First seen in late 1957, this large caliber launcher is mounted on the chassis of a YaAZ-214 heavy cargo truck, a three-axle, all-wheel-drive vehicle equipped with flotation-type tires. The launching unit consists of six circular open-rotate type frames, with spiraled guide rails arranged in two banks of three frames each. A one-third turn initial spin is imparted by the spiraled guide rails. Each rocket has four fins for stabilization during flight, and a single venturi in the base.

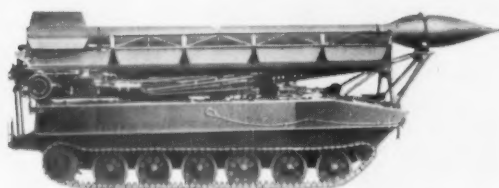
ized rifle division equipped with 18 140mm truck-mounted rocket launchers.

The tank army's role in offensive is shock action for exploitation and deep penetration. After a breakthrough has been achieved, the army advances rapidly. It can hold ground for only short periods. In defense, the tank army is a mobile counter-attack force. It is employed to deliver a decisive counter-attack after the attacking enemy has become weakened or has been placed in a position to be routed by a blow on the flank or the rear. Thus, as artillery support in the tank army, the rocket is employed because of its mobility and intensive firepower. Emphasis is given to the 240mm rocket to achieve shock action.

The combined-arms army is motorized infantry heavy, i.e., composed mostly of motorized rifle divisions. It also has a rocket brigade and at least one tank division. Rocket launchers employed with the motorized rifle division and the tank division are the same as when these divisions

are with the tank army. The combined-arms army is a versatile force that can perform a variety of missions. It may operate on the enemy flank or, after a breakthrough, in the enemy rear. It is able to overcome moderately strong resistance and to provide the ground-holding elements which the tank army lacks. The combined-arms army is particularly suited to a pursuit role. Here again, the rocket is employed in artillery support because of its mobility and mass firepower. Emphasis is given to the 140mm rocket to facilitate logistical support.

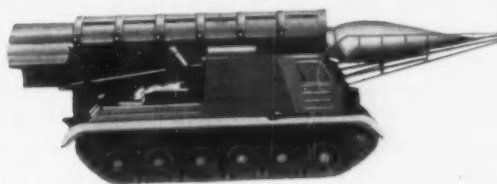
The predominant tenet of Soviet tactical doctrine is that is that decisive results are achieved only through offensive action. The Soviet Army places great emphasis on the achievement of surprise as shifting the balance of combat in their favor. To achieve initial surprise it undertakes to combine speed, secrecy, deception, unfavorable terrain and weather conditions, overwhelming massed firepower, and timing. Where heavy defenses require concentration of force, the Soviet



**Figure 7.** One-round rocket launcher on amphibian chassis

Vehicle weight with  
launcher and rocket 15.7 short tons  
Rocket: Maximum range 30,000 yards  
Weight (HE) 5,400 pounds

The public's introduction to the first Soviet rocket launcher mounted on an amphibian chassis occurred in the Moscow parade of November 1957. The carrier is similar to the PT-76 amphibian tank chassis. It appears that this weapon is readily placed into firing position. The unit is cross-leveled and stabilized by two jack pads attached to the rear of the carrier. The four-finned rocket is fin- and spin-stabilized. Exit venturis are probably canted to induce spin. The body for the rocket's solid propellant type motor consists of two sections, as indicated by the step near the rocket's midpoint. Size of the warhead suggests a nuclear capability. This is a long-range weapon in the Soviet arsenal of rockets.



**Figure 8.** One-round rocket launcher on heavy tank chassis

Vehicle weight with  
launcher and rocket 36.5 short tons  
Rocket: Maximum range 70,000 yards  
Weight (HE) 7,000 pounds

This massive, single-tube rocket launcher, first seen in 1957, is mounted on a chassis whose appearance and performance characteristics are nearly identical to those of the Stalin heavy tank. The tube-type launcher is primarily a cylindrical housing composed of large segments which clamp together. This housing protects the rocket and provides rigidity for cross-country travel. The rocket is fin-stabilized by means of six fins, and spin-stabilized by means of six radial venturis in the base of the rocket. This base also has central venturi. The large bulbous warhead suggests a nuclear capability. This weapon is also classed as long-range.

Army proposes to minimize the presentation of a target by rapid build-up from assembly areas for a surprise assault at a point of main effort and to continue the advance deep into the enemy rear after the defenses are breached.

Of these several factors, speed, overwhelming massed firepower, and rapid build-up from assembly areas suggest the rocket launcher. In a matter of seconds a pre-loaded rocket launcher can fire a salvo that would take a gun several minutes to fire. Concentrating a number of multi-barrel launchers, overwhelming massed firepower can be achieved. Rapid assembly from dispersal areas indicates the mobility of the vehicle-mounted launcher.

In addition, rockets, since they are capable of delivering large volumes of fire in a very short time, are ideally suited for the rapid dissemination of chemical agents on area targets. The extent to which the Soviet Army is planning for chemical warfare is unknown. However, it is estimated that a sizeable amount of conventional

Soviet artillery shell stocks have chemical warheads. The amount for rocket warheads could well be higher.

It appears that the Soviet Army in its weapons evaluation has given a high priority to the free-artillery rocket as a weapon which will help achieve the military goal of mobility, firepower, and shock action. Under this priority evaluation of rockets, the disadvantages as weighed or measured by the Soviet Army apparently do not constitute limiting factors which would reduce the rocket to a minor role. It also must be assumed that the Soviet Army has given considered judgment to the use of the rocket employing chemical warfare agents as the payload. Thus, with its multibarrel vehicle-mounted rocket launchers the Soviet Army has a dual purpose weapon which offers mobility and intensive firepower both for conventional and chemical warfare; with its single round track-mounted rocket launchers the Soviet Army has a highly mobile weapon which offers a nuclear capability.



## Maj. FRANK B. CASE

**S**UCCESS in developing a modern field army capable of maneuvering freely over the nuclear battlefield awaits improved logistics. Today, our combat forces are relatively mobile. On tracks or on foot, they can move, shoot, and communicate over most types of terrain. But exploitation of their potential tactical mobility is limited by the capacity of support forces to deliver food, fuel, and ammunition.

Logistical ground mobility is still largely limited to the mobility of wheels on roads. In undeveloped areas, this ties combat elements to an inflexible line of communication. Aircraft, which offer logistical flexibility and responsiveness, at present cannot deliver the total volume of supplies and equipment needed by modern combat forces. If the field army could wait, the future would bring better logistical mobility on the ground and in the air. But the nuclear battlefield is today's battlefield. Improvements in logistics provided by equipment now in the research and development laboratories may come too late.

Today's basic problem in logistics is to find ways of using existing resources so as to assure support that will encourage the fullest possible exploitation of tactical mobility.

The logistics phases of Exercise Little Bear—U. S. Army, Alaska's (USARAL) 1960 winter maneuver—were designed to test this objective. Because analysis of Little Bear's logistics points the way to evolutionary progress toward development of effective capabilities for support of mobile combat operations, it furnishes much thought for every operations planner.

*Troops depend upon a steady flow of rations. These men are heating C rations atop the Alaskan snows.*



# LOGISTIC

Little Bear employed as Aggressor the 1st Battle Group of the 9th Infantry, a USARAL unit. The 1st Battle Group of the 12th Infantry (4th Infantry Division) played U. S. Force. The problem continued the situation of Cold Bay and Caribou Creek, USARAL's 1958 and 1959 winter exercises.

Aggressor, established in the Fairbanks area, was attacking toward Anchorage. U. S. Force, defending the highway access to Anchorage from the north, had the mission of destroying Aggressor. Abandoning the obvious avenue of the single highway through the region, Aggressor disappeared into the tundra, drawing the defender out of his strong position in Tahneta Pass. Widely dispersed in the effort to prevent Aggressor from bypassing, U. S. Force was exposed to defeat in detail by Aggressor's superior ground-mobile firepower.

The opposing forces met in an undeveloped region some 40 miles long by 30 miles deep. The area is a plateau which slopes gently from west to east and is studded with a multitude of small and medium size lakes. Vegetation ranges from fair-sized evergreens, spaced widely enough to pass armor, to dense scrub which only a bulldozer



*Ski-mounted troops inch their way ahead in a typical northern land operation. They are preceded by an M-29 Snow Weasel which is clearing a path*

# MOBILITY TODAY

## *The Little Bear Experience*

or a tank can negotiate. The ground generally has a high moisture content. During February it is frozen, except where hot springs make treacherous bog holes. At the beginning of the exercise, snow cover had accumulated during the winter to a depth of about two feet. The major defensive terrain feature is Tolsona Creek, whose sharply rising banks can be scaled with difficulty by tanks, other tracked vehicles requiring assistance. The high ground on the southwest side of Tolsona Creek commands the avenues of approach from the Aggressor position.

### **Air mobility vs. armored firepower**

For artillery support, U. S. Force had a battery of towed 105 howitzers, with M59 armored personnel carriers for prime movers. However, U. S. Force had exclusive use of the H-21 helicopter company organic to USARAL. While Aggressor had no aircraft except observation and liaison H-13s and L-19s, his was a normal reinforced battle group task force. It included a battery of self-propelled 105 howitzers, a company of light tanks, and an APC company, in addition to engineer and signal elements. The problem matched

tactical air mobility against armored firepower in terrain difficult for both sides.

When a battle group fights as a nondivisional unit, or as an element of a division that is dispersed beyond the range at which division trains can support it from a central position, support bases must be established to furnish that tactical direct support normally provided by division trains. In the problem's situation, both battle groups worked independently, and an administrative support base was established for each force. The support bases combined the direct support capabilities of division trains with some of the general support capabilities normally provided by field army agencies. Each base carried approximately ten days of class I and class V supplies, and special class II and class IV stocks. It also operated a bulk POL storage and transfer point. Throughout the exercise, POL was delivered to the support base's bulk storage point from the rear. The bases also furnished field maintenance support for the battle groups and certain other back-up services.

Objectives of the exercise included determining the distance at which the support base could continually support the battle group, and evaluating

the ability of the support base to displace in conformity with the tactical situation, without interrupting support operations.

### Helicopters for supply support

The maneuver opened briskly. U. S. Force, with air operations interrupted at H-hour by the first bad flying weather in days, started its leading elements forward on skis. When the weather cleared, the helicopters began to leapfrog rifle companies forward until they stood generally on the line of Tolsona Creek. There they occupied the strong natural position and awaited Aggressor's approach. They were confident that after slogging his way across 60 miles of wilderness, Aggressor would be already effectively weakened, his troops fatigued, his equipment in need of repair.

The use of helicopters for supply support of forward combat elements was the most significant feature of U. S. Force's logistical operations. When employed in a very large area without boundary restrictions—normal when employing task forces in Northern regions—the battle group inclines to spread over a relatively wide and deep zone. The entire battle group becomes, in effect, a reconnaissance force initially, with companies frequently separated by several miles from units to flanks and rear.

### Supply by M59 APC

In such situations, because of its excellent mobility and some load-carrying capacity, the M59 APC has been used for resupplying forward elements. An M59 can carry up to two days' supplies for a rifle company, along with company equipment. But to haul a day's issue by M59 from battle group trains 15 or 20 miles forward to a rifle company, breaking trail all the way, to locate the unit in the forward area, deliver the load and return to the trains, takes many hours and much precious fuel. Using armored personnel carriers for kitchen trucks and company resupply ties up half a dozen of them full time and precludes their use for combat.

In contrast, a light cargo helicopter can carry a slung load nearly the equal of that carried by the APC and can deliver it in minutes when ground delivery may require the same number of hours. For helicopter resupply, U. S. Force used a skid-pallet with toboggan front, built of heavy plywood and bound with strap iron. It was so designed as to allow the palletized load to be drawn from the helicopter drop point to the company breakdown point by Weasel or other light tracked vehicles available in the rifle company. Helicopter resupply saved much package-handling since battle group trains never physically received the supplies.

Of course, alternative plans were required for

resupply during bad flying weather. Northern winters include more good than bad flying weather, but air operations occasionally are hindered by ground fog, icing conditions, and other factors. U. S. Force met the threat of interrupted air operations. It delivered the daily air resupply to the company by placing a mixed palletload of supplies an hour's ski march behind each forward company. This load was for emergency use only. As the companies advanced, a series of company dumps of food, fuel, and small arms ammunition was laid out on the back trail. If bad flying weather should continue long enough to allow a company to run out of supplies, the company could fall back from one dump to another until the weather cleared and air resupply support for forward movement could be resumed.

For combat in Northern regions and for widely dispersed operations elsewhere, helicopter resupply of forward rifle companies appears to be logical and economical. Two H-21s can resupply forward companies of a battle group task force and lay down emergency dumps behind the companies during a part of their flying day, yet be free for other tasks the rest of the time.

### Aggressor's logistical methods

At H-hour, Aggressor sent out a spearhead of armor. This was followed by infantry on skis and in carriers, while his engineers settled down to the grim business of pushing forward a road through the brush and muskeg. Despite some difficulties, engineer progress was rapid. During the ten-day exercise, in addition to preparing five successive positions for displacing battle group trains and a forward position for the support base, Aggressor's engineer company (army) organic to the battle group task force, reinforced by the engineer construction company of his support base, laid some 60 miles of well-constructed two-way road.

Resupply movements were continuous over the main supply road (MSR). Throughout the exercise, POL resupply was Aggressor's main difficulty. POL transport consisted of a 5,000-gallon semitrailer, five (later six) 1,200-gallon tactical tankers, 55-gallon drums, and 5-gallon cans. The 5,000-gallon tanker was moved into the battle group trains area, and here it served as mobile bulk storage. The 1,200-gallon tankers hauled fuel from the bulk class III supply point to the trains, where for forward delivery drums and cans were filled from the 5,000-gallon storage tanker.

During the most frantic hours, when the armored spearhead was threatened with a gasoline drought, the tankers—even the 5,000-gallon semitrailer—were sent forward of battle group trains over the unfinished road to directly refuel combat





*Forward delivery of POL over rough country to heavy consumers such as tank outfits is another obstacle encountered in northern regions. These resupply vehicles are following a path cut by D-8 Cats.*

vehicles. This counsel of despair upset the distribution system and, at one point, necessitated a 23-hour turnaround for 1,200-gallon tankers that were running from the rear bulk storage area.

#### **Better storage methods needed**

This exercise demonstrated the need for improved methods of bulk storage of POL at the support base and battle group trains, and for forward distribution of POL from the trains area. The need of mobile bulk storage in the trains is particularly important. During the exercise, experiments with two flexible 3,000-gallon pillow tanks in the support base class III supply point met with considerable success. Previous experiments indicated that these tanks cannot be set up in temperatures below minus 20, but they are useful at ordinary winter temperatures to provide means of increasing bulk fuel storage under field conditions with major savings in rigid tanks. A tracked POL tanker would have facilitated forward distribution of fuel to heavy consumers such as the tank company and the armored personnel carrier company.

Aggressor battle group employed four M8A2 cargo tractors for forward delivery of drummed POL, rations and ammunition. Without waiting for engineer support, these sturdy, high-performance vehicles pushed ahead with seven- and eight-ton loads of drums and cans, rations and ammunition. As nearly as possible, they worked 24 hours a day throughout the exercise, using relatively little fuel themselves. They stood up under the very least unit maintenance their dog-tired drivers could get away with—and that the S4 dared allow time for. The importance of providing tracked logistical vehicles to the battle group was clearly demonstrated by the Aggressor force. It appeared that, without the M8s, Aggressor's armored drive across country would have bogged down early in the exercise.

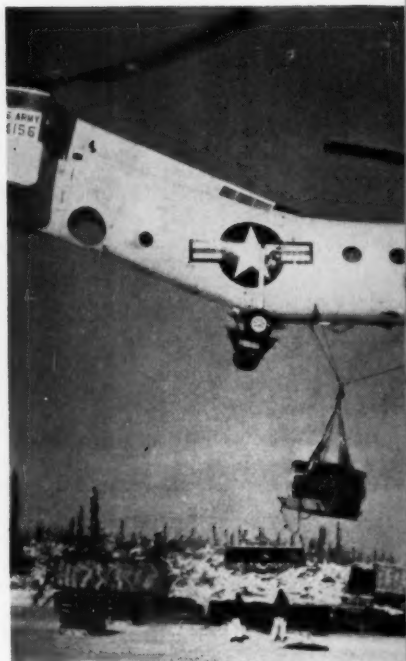
Aggressor force was supplied with four of the recently standardized but still experimental ten-ton off-road trailers developed by Transportation Corps to replace cargo sleds. The trailers promised to make a valuable contribution to battle group mobility during cross-country operations, but the pledge was not fulfilled. The tires that came with the trailers were designed for Icecap



*Undeveloped areas and unfavorable weather conditions are two problems we will face in future warfare. This M-59 is carrying an Honest John rocket.*

*Helicopters can carry out forward delivery of men and supplies in minutes whereas ground delivery frequently may require an equal number of hours.*

*Elements of a forward battle group must maintain effective communications with its supply agency in order to make the most of its available support.*



operations, and accordingly, were thin and without tread. Without tread, they were dangerous on icy highways leading to the maneuver area. Thin-skinned, they lasted only a few days in the brush. But before the tires failed, the trailers demonstrated amazing mobility over rough country. Their high capacity, coupled with low draw-bar pull, indicated that the large-wheel configuration has great potential for mobilizing supply points and providing self-sustaining support capabilities for independent task forces.

#### **Aggressor's tactics stymied by logistics**

Aggressor's combat plan was admirably aggressive but it failed to consider the limitations of his logistical back-up forces. By launching an armored spearhead across country initially and rapidly deploying the battle group over an area 15 miles wide and 20 deep, the plan overextended the capabilities of battle group trains and the support base from the outset of the problem—long before there was any prospect of contact with the enemy. As a result, by the time contact became imminent, the supporting forces were worn out.

No doubt, the fact that the support base was not under his control encouraged the battle group commander in assuming that the support base, working for a common higher headquarters, would somehow manage to support him. In fact, higher headquarters had few resources with which to reinforce the support base. It appeared that, had the operation continued, eventually the

support base would have lost its support capability through simple overwork of people and equipment.

The excessive demands placed upon support forces early in the operation could have been avoided by a different operations plan without sacrificing speed and combat effectiveness during the advance. Had the early logistical burden been reduced, the full support potential would have been available to the battle group after contact was gained. The capability to provide support at emergency level for a few days is as much a combat resource as the class V basic load, and should be conserved by the tactical planner for expenditure when it will best serve his mission.

Aggressor's rapid advance quickly carried his battle group beyond the forward delivery range of the support base. On the sixth day, the support base was given permission to displace forward. At 0400 on 15 February, the base began a displacement of some 25 miles. At 1215, the tail of its last serial cleared the initial base area, leaving behind 30 or 40 truckloads of supplies. Also, the class III supply point, which could not be moved for administrative reasons, was left behind with a few operating and security personnel.

By dusk, the support base was operating in its new location with from four to seven days' supplies in the various classes. This displacement demonstrated that a support base designed with due consideration for tactical needs can be moved rapidly and relatively easily. Displacement could be made easier by dividing the support base func-



tions into direct support and general support echelons, so that the direct support echelon would not be burdened with excessive stockages.

At 1245 on the 15th, half an hour after the bulk of the support base had cleared, a rifle company of U. S. Force landed in the old base area. On the first day of the exercise, U. S. Force had landed an extended ground reconnaissance (EGR) squad near Aggressor's support base. A few members of this team were captured (Aggressor's support base motor pool prided itself on capturing more prisoners in the first days of the problem than his battle group) but the rest were withdrawn by U. S. Force helicopters on the fourth day.

While in the area, the EGR team destroyed a considerable quantity of Aggressor's supplies and disrupted wire communications, but the more important part of its accomplishment was the preparation of a detailed map of the support base area. This map was employed for planning the helicopter-borne attack on the 15th, and the EGR team accompanied the assault force back to the objective and guided the company to all the activities and storage areas in the objective.

U. S. Force scoured out the entire base, which was approximately three miles long and half a mile wide along the MSR. It captured every Aggressor soldier in the area, was credited with destroying all stocks left in the area, blocked and mined the MSR, and effectively ruptured Aggressor's line of communications. Aggressor's reaction was delayed for about 12 hours.

Shortly after midnight on the 16th, the Aggressor battle group's executive officer assembled a pick-up force of battle group trains personnel, mounted them in APCs, and moved out to clear the MSR. Except for mines, the relieving force found the LOC open when it arrived in the rear at dawn, the old support base area being clear of U. S. Force elements. Later in the day, when Aggressor had given up his search for the assault force, the U. S. element was recovered by helicopter from a frozen lake a few miles to the rear of the objective.

#### **Vulnerability of rear**

This attack demonstrated the vulnerability of rear installations to helicopter-borne attack, and supports the conclusion that combat troops are needed to defend logistical installations. However, the complete success of the U. S. Force attack, to a considerable extent, was due to the accident that the support base had moved out just before the assault. A few hours earlier the attacking force would have been met by a reception party of 250 men. A few hours later, the remaining bulk supplies would have been transferred forward on the second lift to the new base area and the attack would have found the objective empty.

On the last day of the maneuver U. S. Force executed a similar attack against Aggressor's support base. This time the base was alerted and ready. Where, on the 15th, helicopters had landed on the base airstrip, on the 20th they found it



blocked by trucks and covered by automatic weapons. Other clearings too were obstructed and defended. Eventually the landing was made on a frozen lake outside the base area and, before the attack could be launched, a reinforcement company in the base area on its way to battle group had moved out to meet and destroy the attackers.

In addition, Aggressor support base personnel entered valid claims for destroying the greater part of U. S. Force's helicopters by ground fire. From this phase of the exercise it is evident that, if the defenders are sufficiently determined, rear logistical installations are not completely helpless against copter-borne attack. The corollary conclusion is that copter-borne attacks must be supported by suppressive fires which can most effectively be provided by armed helicopters.

It is important to note that the threat of aerial attack on rear elements, once that threat is taken seriously, is a useful weapon in itself. After the destruction of the Aggressor support base rear element on the 15th, the U. S. Force helicopters, on their way to withdraw the attack force, touched down within sight of the forward support base and battle group trains. Expecting another attack, these elements promptly undertook defensive measures. From then on, a third or more of the operating personnel in the rear installations most of the time were in alert positions. The mere feint of an attack had the effect of reducing available support capabilities by a third—a better result, on the average, than a nuclear threat could assure.

### Logistics and communications

Communications between battle group and support base were excellent for the U. S. Force but were consistently unsatisfactory in Aggressor's more extended operation. Delay in laying wire, shortage of wire, and accidental line breaks, in addition to interruptions from the activities of U. S. Force behind-the-lines elements, made wire communications undependable. Sets of very high frequency equipment were insufficient for assuring continuous communications from the fast-moving battle group's CP to the rear. The support base commander could not be kept informed of the tactical plan and its development, and frequently had no choice but to push supplies forward, hoping that battle group trains could receive them.

Many of the logistical communications difficulties could have been overcome had a stronger appreciation of the importance of communications existed between the battle group and its direct support agency. The exercise demonstrated that, regardless of materiel limitations, if he is to derive full advantage from support capabilities, the

tactical commander must assure that effective communications are maintained with his support forces.

### What we learned

"Getting gas or a pair of shoes has so long been a matter of efficiency," said the acting G4, "that it is impossible for people to face up to any other situation."

Exercise Little Bear developed many of the problems that will arise in support of mobile forces in future war. If, as many now believe, only mobile forces can survive on the nuclear battlefield, the support problems of Little Bear will be encountered in logistics of the future. To meet them, the independent task force must be supported by a mobile base which, freed from the rigid LOC of the past, can live in the same tactical environment as the force it supports, can move rapidly, work flexibly, and take full advantage of terrain for logistical operations. The mobile base's plans must include passive defense measures and tactical security.

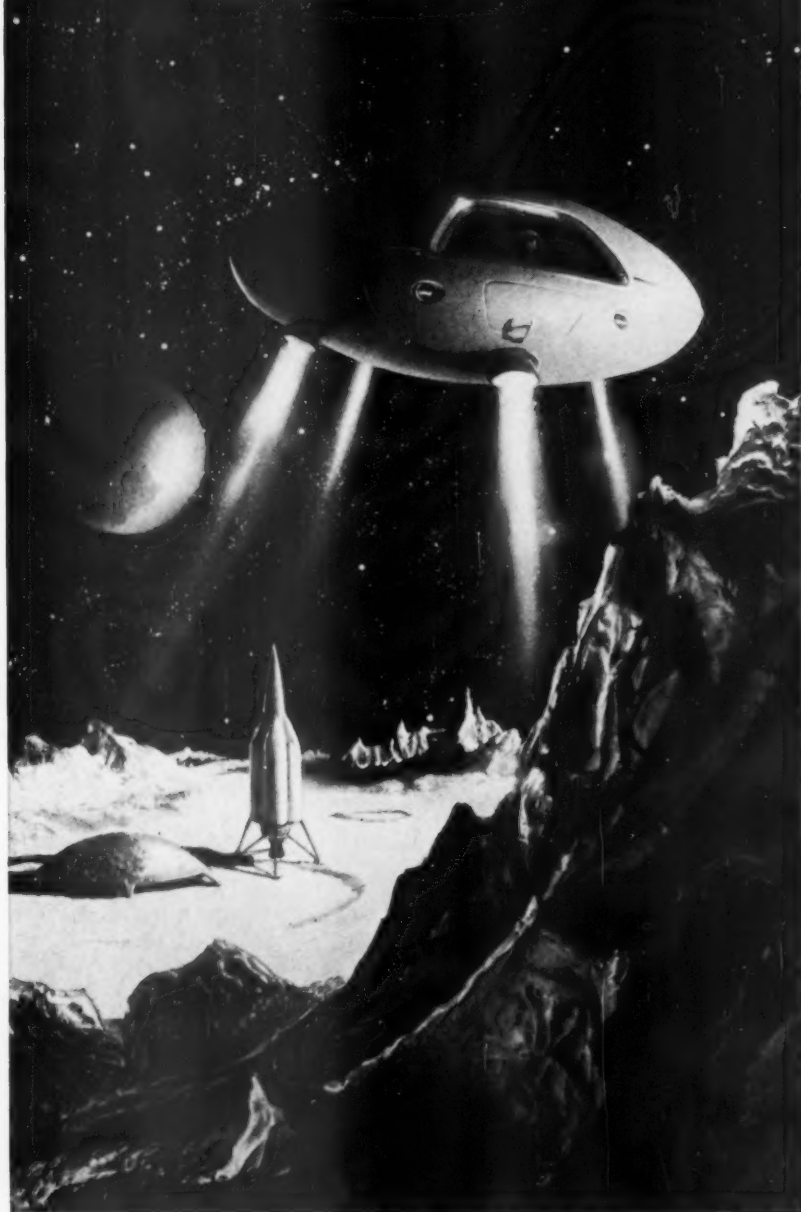
Logistical mobility must be gained by limiting the mission of the support base to direct support functions, thereby keeping the stockage of supplies to the practicable minimum; by utilizing large-capacity off-road vehicles for both operational facilities and mobile supply points; by employing small numbers of helicopters for support of companies in line, and by promoting an aggressive attitude toward the tactical direct support mission on the part of its staff and operating personnel.

Many aspects of mobile support base operations require further development. We must determine the best organization and equipment for type forces in support of various tactical groupings. Better methods of POL supply and distribution must be developed. We must ascertain the practicability of unit distribution of ammunition so as to reduce delivery time to firing positions and make better use of available transport.

It is particularly urgent that we further consider our doctrine for controlling direct support forces. Optimum responsiveness and control would result from attaching the mobile support force to the tactical force supported, but control of the supporting force might exceed the capabilities of current tactical staffs. These problems will be studied in logistical phases of future USARAL maneuvers.

Whatever the form of the future mobile support base, we must establish a close functional understanding between support base and supported force, to assure that logistical capabilities are so employed as to permit optimum exploitation of the mobility potential of modern combat elements.

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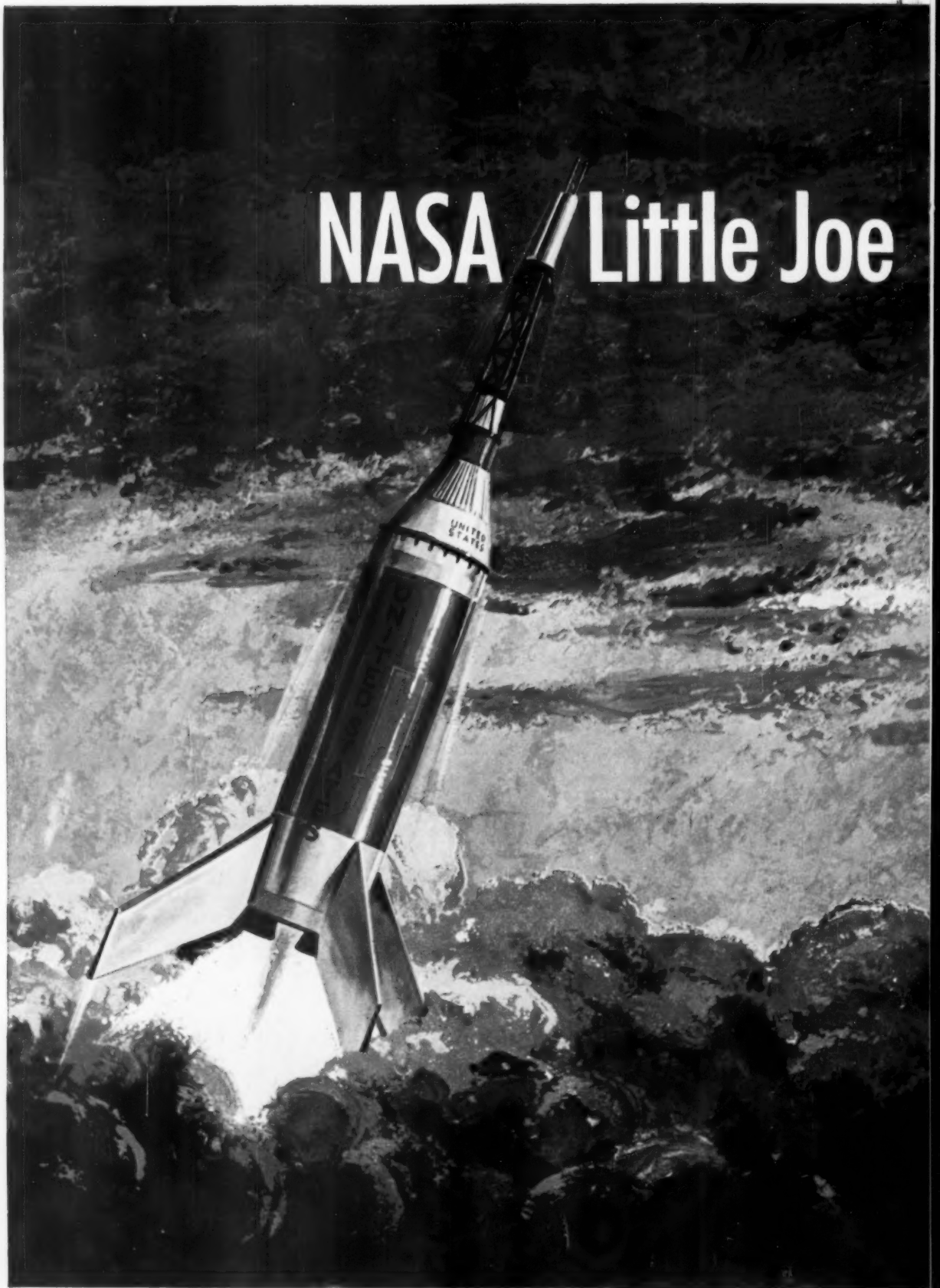
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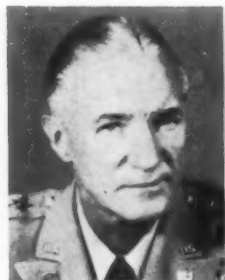
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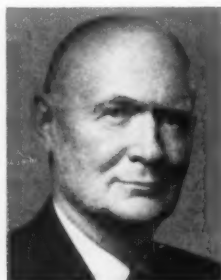
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# A Memorial for the Army in Independence Square

*Lt. Gen. MILTON G. BAKER*

President, Association of the U. S. Army

*During its 1959 Annual Meeting the members of AUSA approved a Resolution calling for the establishment of a memorial at the site of the Army's birthplace in Independence Square, Philadelphia. As a result of this Resolution, a committee was appointed by the President with Lt. Gen. Milton G. Baker (now AUSA's President) as Chairman. In this article, General Baker reports on the significance of an Army Memorial in Independence Square and outlines the plans of the Council of Trustees for a commemorative building.*

SOLDIERS who visit Independence Hall in Philadelphia find a dual basis for their pride as they stand in the historic chamber where the immortal Declaration was signed in 1776. A little more than a year earlier—on 14 June 1775—in the same room, the second Continental Congress created the United States Army.

The delegates were responding to a plea from the embattled patriots of Massachusetts for assistance and leadership in their struggle against the British. To lend that assistance the Congress adopted a resolution authorizing six companies of expert riflemen to be recruited and dispatched to the vicinity of Boston. Two companies each were to be raised in the back country of Maryland, Pennsylvania and Virginia, where frontiersmen had attained almost legendary skill as marksmen. The following day the delegates, upon motion of John Adams, elected George Washington general and commander in chief "of the forces raised and to be raised in defense of American liberty." As soon as his name was put in nomination, Washington, who was a delegate from Virginia, left the room so that any debate about his abilities could be carried on without embarrassment. It was generally known that John Hancock had aspirations for the command, and Artemas Ward, who was leading the New Englanders in actual combat, expected that he might get the post. But with the remarkable sagacity with which the

Continental Congress so often seemed endowed, the Virginian was chosen.

On 16 June Washington accepted the commission with characteristic modesty.

Then the Congress turned its attention to Indian affairs for several hours, and then proceeded to vote on the organization of the line command and staff departments. The next rank after Washington's was Major General—no provision was made for Lieutenant Generals. There was spirited debate about the number of Major Generals and Brigadiers, and after this was resolved, the Adjutant General's Department, the "Commissary general of flour and provisions", the "quarter-master general for the grand army", with a deputy for the separate army, the Paymaster General and "one chief engineer of the grand army" with two assistants were established.

This was quite a day in the history of the United States Army!

THE significance of this chapter of Americana has never been fully appreciated by the average citizen, and those extraordinary seventy-two hours, so portentous for the future of the nation have been overshadowed by the dramatic implications of the Declaration of Independence and the majestic bell which has become the very symbol of our liberty. This, as it should be, is the magnetic force which draws more than a mil-

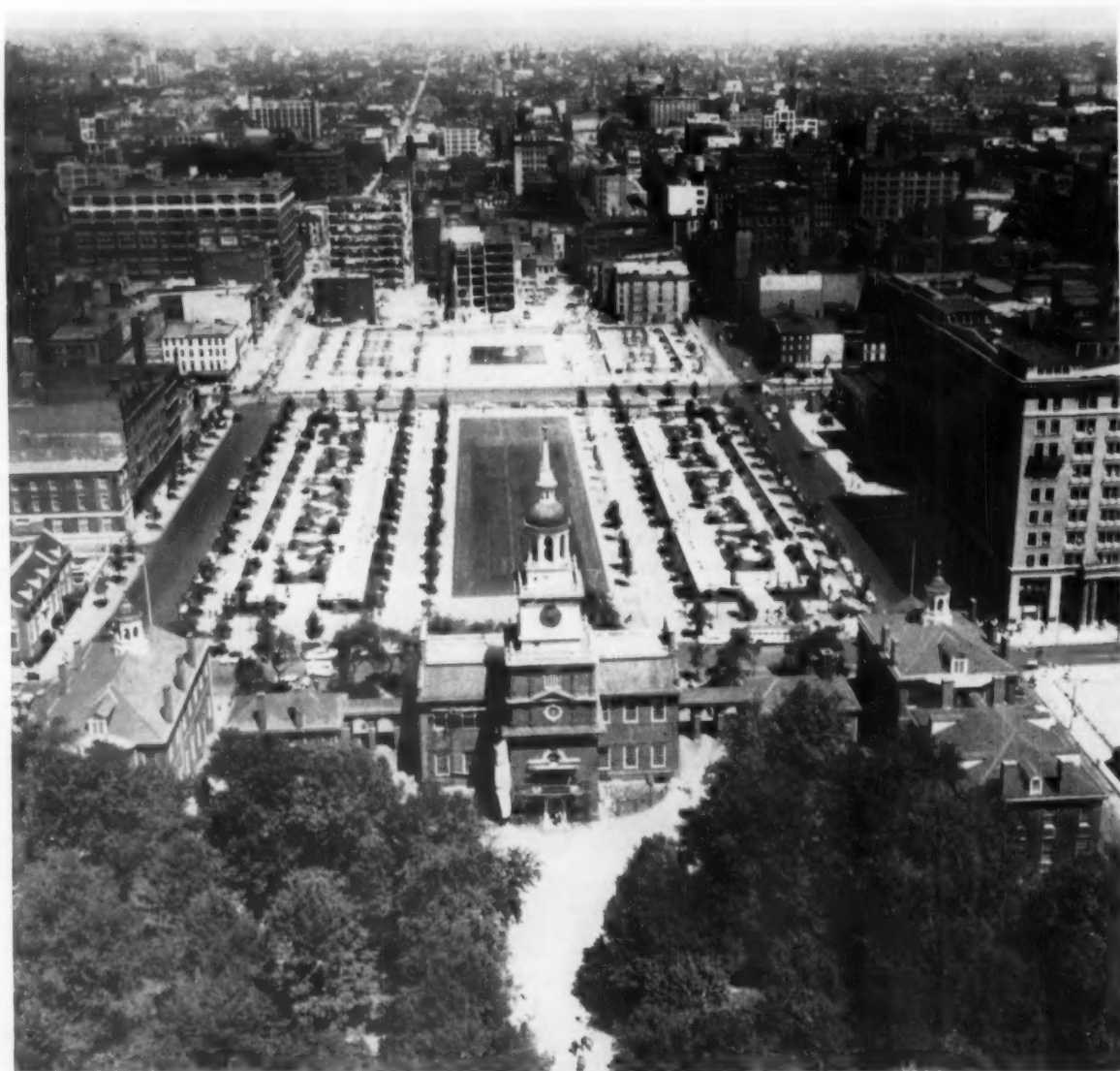


From the upper floor of a building on Walnut Street, the camera is looking north towards Independence Hall and the mall beyond it.

To the left, connected to Independence Hall by an arcade, is the West Wing. To its left is Congress Hall. To the right of Independence Hall is the East Wing, also connected by an arcade, then the Supreme Court building and (in right foreground) the Philosophical Hall. Areas of Independence Square being renovated are hidden by the trees in foreground or are not in the camera's eye.

lion visitors each year to the hallowed spot, but it also provides a splendid doorway through which they can gain a broad vista of our early history. Within the radius of a mile there are quite a few churches and buildings still standing which were familiar sights to our founding fathers. I have long felt that it would be a wonderful gift to the American people if a building devoted to the high traditions, ideals, and history of the United States Army could be erected near Independence Hall, so that visitors to the shrine of freedom could come to a more complete realization of its part in the making of our country, and the bases of the soldier's pride in its accomplishments.

This is an ideal setting, for the ties which link the Army to this area are not woven out of the incident of creation alone, although that in itself



would be more than sufficient justification. The upper floor of Independence Hall was pressed into service as a hospital for some of the troops who were wounded in the Battle of Brandywine in September 1777. And, by an ironic twist of fate, its dark cellar was used by the British a month later as a prison for Continentals captured in the Battle of Germantown. The British, during their occupation of Philadelphia, from October 1777 to June 1778, also used the grim Walnut Street Prison, which then stood directly opposite the Square. The provost of the prison was a sadistic character, whose reputation for brutality spread quickly through the Continental Army and made him an object of concentrated hatred. Under his administration, a number of Americans died from malnutrition and exposure, as well as from his cruel methods. These, together with other soldiers were buried across the street in a potter's field. This was subsequently to become Washington Square—a pleasant little park—but a tablet reminds us of the hundreds of patriots who were interred there. Approximately twenty miles from Independence Hall is a place which surpasses all the names on all the battle-streamers of the United States Army—Valley Forge—where the foe was not the British, but the very forces of Nature itself. The crucial period through which Washington and his forces passed in that bleak sanctuary requires no elaboration in this article.

Until recently it would have been impractical to construct a commemorative building in the Independence Square neighborhood. During the economic development of the 19th and early 20th centuries, this section of Philadelphia, so close to the city's busy waterfront, became a center of business. Commercial structures crowded out the picturesque atmosphere of former days, and edifices like Carpenters' Hall, the Betsy Ross House and others were boxed in by the surge. Independence Square itself became a small island in a sea of business, and the visitor making his way from shrine to shrine lost much of the rich, historical flavor of his pilgrimage by having to pick his way through a complicated maze.

Now, however, a sweeping renaissance is taking place. Through the combined efforts of the Federal, State and city governments and at the expense of many millions of dollars, office buildings and stores have been razed and replaced by park areas and restoration projects. A beautiful, expansive Mall now forms the approach to Independence Square, and the graceful colonial architecture is making a reappearance in the new construction.

The realization that this entire plan is under the meticulous and diligent care of the National Parks Service, and that it will continue under

their guidance, led me to conclude that this is the time to begin "Operation—Army Historical Memorial."

I consulted officials of the Parks Service and received their encouragement and approval. The building, as I envision it, will fit into the overall pattern of the restoration phases—it will probably be a facsimile of one of the more gracious, larger buildings which stood near Independence Hall during the colonial era. Thus located, it will attract most, if not all, of the visitors to the Hall. It will not be a static memorial, but a vibrant presentation of the Army story, told in a manner which will be educational and inspirational. The treasured relics which will be housed there will not be put indiscriminately in glass cases, but will be displayed through the most modern methods in effective documentation and exhibition. The estimated cost, for building and furnishing is \$500,000.

THE Council of the Association of the United States Army has unanimously endorsed the idea, and both the Secretary of the Army and the Chief of Staff have commended it.

So that this commemorative building may represent as many Army men as possible, the Council feels that the funds should be raised through nominal subscriptions—quarters, half-dollars and dollars—the gift to be entirely dependent upon what the individual he or she may want to donate. The campaign will be strictly limited to members of the AUSA, and to those other who have also been affiliated with, or who are now members of, regular or reserve components of the Army.

It should be emphasized that this is definitely not to be a "pressurized campaign." Those of us who have laid the groundwork believe that the idea will be enthusiastically received and that pride in the Army will be a sufficient motivation to translate this vision quickly into a reality.

This memorial will give the adult visitor a more comprehensive knowledge of the United States Army and its place in our history—but far more important will be the message it will hold for our children and their children. It will bespeak the American soldier's faith, from Lexington to Leyte, from Ticonderoga to Tokyo, and from King's Mountain to Korea. It will remind them that the blessings which God has bestowed upon us have been preserved by gallant men and women who loved liberty more than life itself. It will tell them that the colors and regimental flags which hang in majestic repose above them, once led their fathers through the dark night of battle, so that their own lives might know the light of peace. And this above all—it will tell them that the soldier's faith is a precious part of their precious heritage as Americans!

*To get machines that will give us speed of movement on and over the ground battlefield, concepts must be firmly established.*

Col. DONALD McB. CURTIS

# THE INGREDIENTS OF COMBAT MOBILITY

**W**HAT is combat mobility? To me it is a composite capability that depends upon many factors. Combat mobility is more than the ability to move from one spot to another on the battlefield. Rather, it is the ability and readiness to move whenever and to wherever the situation of the moment demands, and, having moved, to be able and to be ready to fight and move again.

## **The fourth basic function**

Tactical and logistical aspects of combat mobility derive from the basic mission of Army forces—to seize and control ground areas. This control is exercised by applying the necessary force, on the ground and immediately above it, by units fighting from the ground and on it. In order to apply the appropriate degree of force in ground combat, four basic functions are necessary: you must be able to shoot, move, and communicate. That sounds like only three, but I also said “you must be able to.” Herein lies the essence of the logistical aspects of battlefield mobility.

What are some of the factors which determine adequacy of combat mobility? General Carter B.

Magruder has said that the best measure of mobility is the smallness of the tonnage that must be delivered to a unit daily in a fluid combat situation. Another factor is the size of the force, and how far it has to move and how fast. This, in turn, depends on how far that force can exert its control over the ground without displacing as a unit. The rate at which it has to move varies according to the situation it faces. One other factor, which may affect combat mobility more than any other, is that of terrain.

Let's discuss each of these aspects in turn as a lead-in to concepts of future employment of ground forces. First, however, a definition of “mobile” from *Dictionary of United States Army Terms*: “That which can be moved without considerable difficulty. . . . Classification of a unit in which there is sufficient organic transportation to move the authorized personnel and equipment of the unit at one time.”

That is the essence of mobility: the *ability* to move everything that is needed with means organic to a unit. This brings us to the first factor: the tonnages which must be provided.



Current concepts require a daily delivery of supplies to combat units. The larger the quantities of supplies consumed by combat units, particularly that driven by petroleum products, the greater the daily requirement for delivery of heavy tonnages. In turn, this generates the necessity for heavy back-up by service units for storage, distribution, maintenance, and transportation. Within combat units, increased numbers of equipment mean additional maintenance, since to be mobile everyone and everything must ride. This leads to a vicious circle, so that eventually the very mobility we seek is lost because of the immense magnitude of the material required to maintain mobility.

The solution lies in the doctrine of the lean, mean and hungry soldier. Following General Ewell's comment that the road to glory can't be travelled with much baggage, we can say that mobility is hampered by too much too often, as well as by too little too late. If tactical mobility and flexibility are to be improved while at the same time we aim to increase the staying power of the combat units—and to these you add the necessity of thinning out in the battle area—one thing becomes quite clear: we will have to sever the navel cord concept of a daily flood of logistical support over a ground line of communications. This results in two conclusions: combat units must be self-supporting to such an extent that they can fight for several days without resupply and still be completely mobile without dragging the weight of a heavy logistical tail; speed in delivery must replace the mass required to fill the pipeline in a ground LOC.

### Linear warfare is out

In discussing combat mobility, the next factor to consider is the size of the combat unit we should regard as the least common denominator. Too often strategic planners think of ground combat in terms of Clausewitzian classicism and the European continent. This leads to studies in terms of field armies. The 35-odd good-sized ground combat actions which have been fought since 1945 have been of as great strategic significance but on a much smaller scale. The threat of nuclear weapons, whether tactically discriminant or strategically saturating, imposes the necessity for ground units to be able to disperse or move on short notice. And the ever-present and oft-recurring threat of being attacked over the ground en masse or by infiltration dictates an equally vital need to be able to concentrate ground force and power at critical points. We can no longer think in terms of linear warfare. Ground combat in the not too distant future will be a matter of spheres of influence, from key points on the ground. The impracticality of preventing any penetration by

hostile forces at every point in a battle zone is as obvious for ground combat as it is for air attacks.

This points to the third requirement which bears on the size of the unit: namely, a high degree of self-sufficiency. From these three requirements we can conclude that the division is probably the smallest unit which can control its own integrated firepower, maneuver or movement capability, and its own organic logistical means to attain a degree of self-sufficiency. All these are needed if it is to control a specified ground area under the requirements of ability to disperse or converge rapidly in applying force to the battle area, and at the same time maintaining a degree of self-sufficiency in staying power.

What about the distances and speeds of which a division should be capable? There is no one pat answer. Since we are thinking in terms of spheres of influence, the spectrum ranges from a few hundred yards at one or two miles an hour on foot, to a spurt capability perhaps of 50 miles an hour on or close to the ground, and some 200 miles an hour through the air.

Terrain has the greatest effect on any consideration of mobility, particularly when you refer to vehicles. General Mud is still the greatest impediment to mobility. Heavily wooded and mountainous areas also will curtail the mobility of ground vehicles, wheeled or tracked.

### Mobility means speed capability

At this point, you might summarize what we've said somewhat along these lines:

To achieve combat mobility we must reduce the quantities and types of equipment in combat units, but what they need should be portable, along with the men, on organic vehicles. These vehicles and equipment must be simple to operate, and maintained by the fewest numbers of men. They must be able to function on and over any type of terrain for periods of several days at speeds from one to 50 miles an hour.

So far we have not mentioned the vulnerability aspects of materiel, so let's dwell on that briefly.

If we accept the broad concept of the tactical application of the appropriate degree of force where it is required in the combat area primarily through the ability to move rapidly under any conditions, we must accept the idea that combat mobility means a speed capability. In other words, we must rely on quick reaction and movement, rather than mass or weight, for both offensive and defensive tactics. Since terrain is the greatest deterrent to mobility, some means must be found to overcome it. This means we must be able to move on the ground and still be able to cross or bypass terrain obstacles.

To do these things and at the same time achieve

a sustaining capability, we must have a favorable payload-to-weight ratio. VTOL devices such as helicopters meet part of the requirements, but their high rate of fuel consumption and heavy maintenance requirements impose intolerable logistical burdens which hinder over-all combat mobility. A possible solution may lie in the so-called ground-effects vehicle concept. [See "The Air-Cushioned Knock of Opportunity," ARMY, November 1959. Ed.] A vehicle which moves primarily on the ground, but is capable of flying over or around terrain obstacles, would be ideal if its logistical support in fuel and maintenance can be kept below those of today's wheeled vehicles. A combination of such carriers and a logistics resupply missile with a 200-mile range could mean a really effective combat mobility. The range of operations in terms of surface area for a ground combat unit is limited by the extent to which the navel cord of a ground LOC can stretch and still deliver the required tonnages. The time and effort needed to relocate or to establish a new ground line of communications are the limits or the extent of the combat mobility of the users. Divorcing the LOC from the ground by using missiles for resupplying material consumed at repetitive rates will permit the fighting units to exploit their organic battlefield mobility to the fullest extent. For example, a division could move anywhere within the missile range of the logistical base of operations, yet receive the desired quantity of resupply at a specified location on call.

### Resupply by missile

While at first blush the use of missiles might be considered too costly, it is possible to develop expendable or recoverable boosters so that the operational cost will be only that of the fuel or propellant. Also, delivery capsules can be recovered. These capsules could be so designed that they could be used as carriers for casualties, and then returned to the logistical base as pods on evacuation aircraft. These evacuation aircraft could augment the supply effort by carrying payloads up to the division area on return trips.

Since men are more vulnerable than machines, and their ability to fight at peak efficiency is limited, we must provide for periodic rest and refit. This could be done through a unit rotation cycle. A combat unit, either a full division or a major part of one, would return to a logistical support area every three or four days for 24 hours. During this time, it would be completely replenished, rested, repaired, and refitted for another combat tour. Since what we seek is organic self-sufficiency of the unit for several days, the logistical support required between these rest periods would be limited to emergency demands for resupply, repair, or evacuation on an on-call basis. Such sup-

port would be delivered direct from the logistical support area by missile or aircraft.

A combat vehicle's vulnerability depends on its detection and identification, and its accurate location, and all within a period during which the enemy can damage it. If we rely on heavy coatings of protection against all possible hazards, the resultant weight will nullify its speed and independence of terrain which are essential for the requisite combat mobility. With an adequate surveillance capability, of which speed, range, and mobility are important parts, the vehicles can be better protected through prompt and rapid movement. From a ground combat point of view, concentration of forces is not inherently evil. It becomes a hazard only if the enemy becomes aware of the weakness and has time and means to exploit it.

### POL the stumbling block

At the current state of the art, POL requirements for vehicles are the biggest stumbling block in the logistical aspects of combat mobility. If we are to reduce POL tonnage requirements, a major breakthrough is urgently needed in both fuels and engines. In the interim, the reduction in numbers and weight of vehicles and the addition of a limited flying capability appear the only immediate solution. By insuring the ability to speedily cover distance, the relative expenditures of POL may be somewhat lessened even though the hourly rate of consumption may approximate that of a ground vehicle. For example, if I can move the same tonnage 100 miles in one hour by a ground-air vehicle as against 100 miles in five hours by ground vehicle, and the consumption of fuel per hour is the same, the reduction in fuel needed is obvious. Here is one saving in operating costs which can offset a vehicle's possible higher initial cost.

Reduced maintenance is a function of technological improvement in equipment design. Some possibilities are sealed bearings, quick-release component replacement, and minimum numbers of components. Reduced maintenance not only means less tonnage in repair parts and tools, but also less men for maintenance. This in turn means less tonnage which would otherwise be required for supporting them, and less vehicles for moving them. Here again are possible savings in repetitive operating costs which could be applied toward logistical missiles and ground-air vehicles.

This represents a concept of the combat mobility we should have. While we must move on the ground in applying force in the battle area, we must have the vehicles that will allow full use of rapid movement unrestricted by terrain conditions.

**Col. JAMES H. HAYES**

**T**HERE is a story about a starving grasshopper who was told by a wise old owl that the way to survive was to change into an ant. When the owl was asked how this could be done, there was a moment of shocked amazement at the question. The owl had succinctly stated the guidance; implementation was the grasshopper's problem, not his.

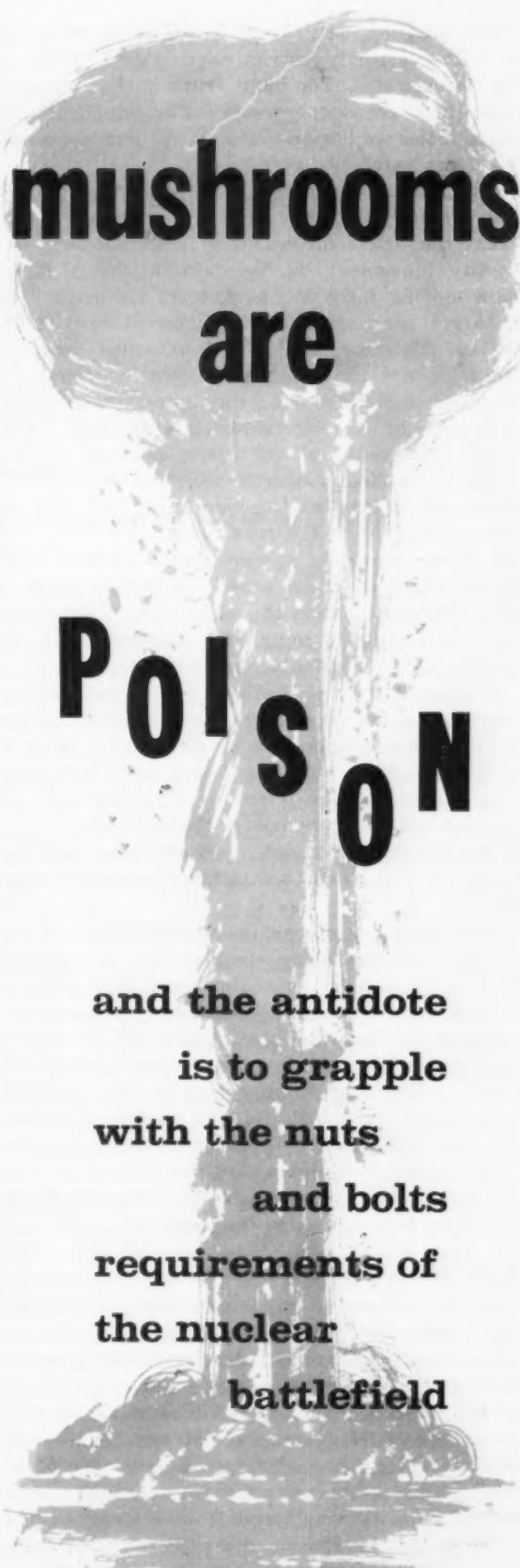
This story neatly describes the Army's predicament as it faces tomorrow's nuclear battlefield. Clearly, the solution to survival lies in dispersion, mobility, flexibility, firepower, communications, and leadership. But the Army, like the grasshopper, now must find out how to do it. In searching for an answer, certain other facts must be faced honestly, facts which cannot be ignored or wished away.

First, any formation detected moving over open or other types of ground can be destroyed or neutralized by nuclear strikes. The guiding principle is simply whether the target is worth expending weapons of suitable yield.

Secondly, nuclear blasts can be so powerful that no hastily constructed position can withstand them. The weapons in our arsenal run from subkiloton yields to those measured in megatons. Thus, once we decide, there is little doubt that we can obliterate a specific division or battle group defensive position. All we need do is reasonably fix the enemy position, and have some idea of the type of construction.

Thirdly, operational guided missiles enable us to destroy the enemy from a variety of ranges. Thus, nuclear weapons of subkiloton yield can be fired from close in, while those of large yield can be shot from distances measured in hundreds of kilometers. In the first instance, targets of opportunity may be engaged; in the second, specialized patrols working far in front can cunningly scout established positions and call down overwhelming firepower upon them. These scouts can travel at great distances from main forces which can be held dispersed and hidden far to the rear behind carefully disposed screening forces. Of course, this assumes that the enemy will conveniently employ a rather fixed and conventional type of defensive position. If this occurs, a few American soldiers can destroy masses of enemy at long range with no necessity for engaging in the close combat of a pitched battle. In other words, if the enemy masses or defends in a static position, we no longer need to close with him. His combat effectiveness can be destroyed by fire alone. Which brings us to the last and most ominous fact of all.

The hardest truth of all to face is this: whatever we propose to do to the enemy with our nu-



**mushrooms  
are**

**P O I S O N**

**and the antidote  
is to grapple  
with the nuts  
and bolts  
requirements of  
the nuclear  
battlefield**



clear weapons, he in turn can do to us with his. It is unnecessarily restrictive to qualify "soldiers" by "American." The blunt truth is that our enemies now possess (or will have soon) all the capabilities we have described. We must squarely face this harsh reality.

The major conclusions of our analysis now follow almost inexorably. From a doctrinal standpoint they have far-reaching implications.

Any movement during daylight by a large, slow-moving force will most certainly mark it as a target for nuclear fire, because it can be detected. This means that the extended order of today is not the solution. A battle group, for example, moving during daylight in a standard formation of three-up-two-back is too easily identified. Inevitably it will invite nuclear fire because it is clearly worth such an expenditure. Moreover, if this battle group is on foot, moving across country at the traditional rate of a mile an hour, there is strong doubt that it will arrive intact anywhere near its objective. Massed tank formations face the same risk of detection and destruction, although the number of strikes required would undoubtedly be greater.

It may be argued that because of our current time-consuming procedures for releasing and firing a nuclear weapon, this battle group or massed armor formation would be fairly safe. We must also admit that the stress of a nuclear conflict and the tactical exigencies of the day cancel many of our current administrative and legal restrictions—as well as any restrictions the enemy may have.

Continued use of the position defense for extended periods during nuclear war is suicide. Once a position is reasonably accurately spotted it need not be attacked by troops; it can be obliterated by nuclear blasts directed by small, highly specialized fire teams. The destruction could be executed at little cost to the attacker. Though we may wish for the enemy to attack our carefully prepared positions with troops, he is not going to adopt a doctrine convenient for us. In fact, he will choose a method that he thinks will bring him victory at the least cost.

### **A new concept of defense is needed**

By its very concept, position defense is static, rigid, and immovable. These conditions invite nuclear disaster. Even the devices of switch positions and blocking positions, as now conceived, do not provide sufficient flexibility to overcome the inherent disadvantages. We need some different thinking about defense: a new concept of what is important and what is not, and a new way of implementing the defensive idea.

The perimeter defense, designed to hold a piece of ground to the last man, undoubtedly will do

just that—the perimeter fits the base of the mushroom cloud too precisely. Actually, it would appear that any attempt to hold any piece of ground for any indefinite period invites disaster. Specific terrain features lose their importance in nuclear war because we accomplish nothing by holding onto this or that hill as a link in a defensive chain. The enemy is merely offered a fixed target which he can ultimately destroy with nuclear weapons if he is willing to expend them. Communications centers also lose much of their importance because one or two well-placed strikes can convert them into gigantic roadblocks. Anyone who remembers the rubble streets of Europe during World War II can attest to the blocking effects of even these minor (by comparison) bombings. Forests present the same blocking effect because of blowdowns.

Our dilemma, then, boils down to a few stark realities. In a nuclear war, units must never offer a target suitable for a nuclear strike, because that target can be destroyed or neutralized. Infantry cannot move on foot during daylight because such action will invite nuclear destruction. Massed armor in the World War II pattern is too vulnerable. Finally, the position and perimeter defenses, because they are static, merely offer themselves as targets for obliteration. The enemy need not risk his troops in attacking a position, because he can stand off and launch nuclear warheads in appropriate numbers and yields. These statements in effect deny to the soldier many concepts he has cherished as truths through the ages.

To deal with this dilemma if nuclear war comes now, we have the Pentomic division and our current doctrinal concepts. Are they adequate for the job?

Let's explore some of the ramifications by examining a hypothetical combat situation placed in the first half of the 1960s.

### **General situation**

The unstable political relations since 1946 between Aggressor and the United States had never really been resolved. It had been strained by a series of crises which, however, had been merely the crests of major waves of general disagreement. Accordingly, during the early sixties summit conferences offered great expectations that some accord could be achieved. Thus far they have failed. Consequently, no surprise resulted when reconnaissance satellites began detecting abnormally heavy rail and motor traffic from the interior of Aggressor toward its borders. The mounting pattern of offensive build-up was so overpowering that U. S. forces were placed on continuous alert. Aggressor attacked on May Day, 19--. The nuclear-free initial assault was

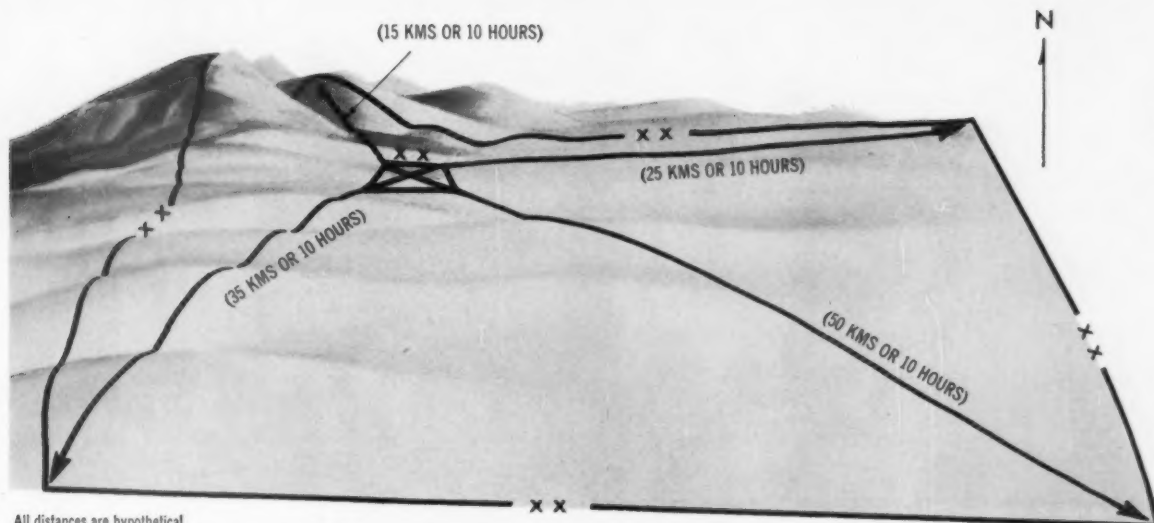


FIGURE 1. To control an area time and mobility must be considered in selecting the control location

led by tank formations followed by the traditional mass of Aggressor mechanized infantry divisions. However, one Aggressor commander (under great pressure from his superiors to advance faster) in a fit of frustration employed a tactical nuclear strike to crush the position holding up his main effort.

Thus the Great Nuclear War began, not by design or calculation, but through stupid miscalculation. However, up to now, neither side had resorted to strategic bombing, and had used only tactical nuclear strikes. Even this tactical use had been moderate and against obviously remunerative targets. It is now H plus 12.

#### You head a division

You command an infantry division. During the course of the first day's fighting your corps commander telephones you this order: "Aggressor used nuclear weapons about an hour ago against the roadblock at Budubach. Move your division out immediately to *control* the area bounded by Aumeilembach, CR 147, B 17 463 and Bububach—that's about 65 kilometers square. Remember, I want you to *control* the area, not . . ." At this moment the line goes out and as you look over your shoulder you observe the dreaded mushroom cloud where the corps command post used to be.

#### How do you control an area?

**FIRST REQUIREMENT.** Determine for yourself the meaning of the corps commander's last cryptic use of the word *control*.

**DISCUSSION.** Our use of the word *control* is deliberate. It was chosen to emphasize that the division commander is not limited to holding a specific terrain feature. He is a free agent within the framework of his mission, responsible only for

making it impossible for the enemy to seize the initiative in the *control area*. If enemy forces penetrate the control area they will be expelled or be so harassed, attacked and annoyed as to nullify their influence there. There were examples of this principle during the latter stages of the German occupation of the USSR. Here, the Germans dominated only that area in which they were physically present; if they moved out of it they had to do so in large bands. Individual soldiers, couriers, and supply trains could not be sure they would traverse the area between two points because guerrilla groups were in control. The cumulative effect of the Germans' lack of control, even though they were in physical possession, contributed significantly to their ultimate defeat.

An area can be controlled by physical possession, although as we have seen that is not enough. The commander must know everything that is happening in his area. Hence he must have accurate intelligence. Next, control implies that other agencies in an area, such as the natives, are either friendly or cannot be organized into resistance groups. Thus the commander must have adequate reconnaissance to warn him of enemy military activity, or must obtain such reconnaissance from higher headquarters, or must improvise it from his own resources. Finally, there must be adequate counter-intelligence effort to insure that hostile civilian or quasi-military groups have been unable to form. The counter-intelligence effort is clearly the major responsibility of higher headquarters. However, each commander, regardless of the situation, must look to his own security.

The control area is a square approximately 65 kilometers on a side. This dimension is chosen in order to prevent destruction of two battle groups

# Z—FORMATION

## BASIC TYPES

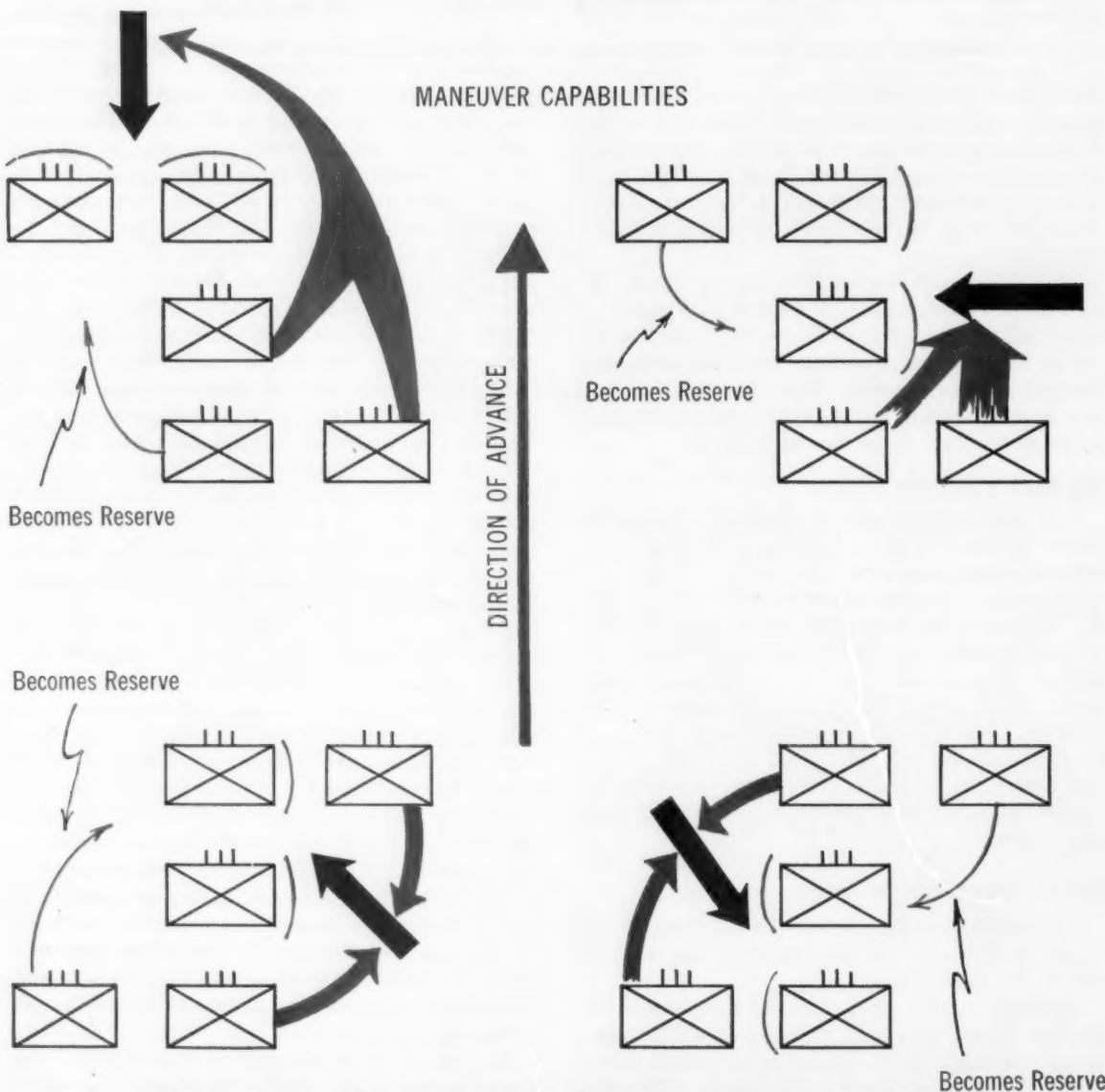
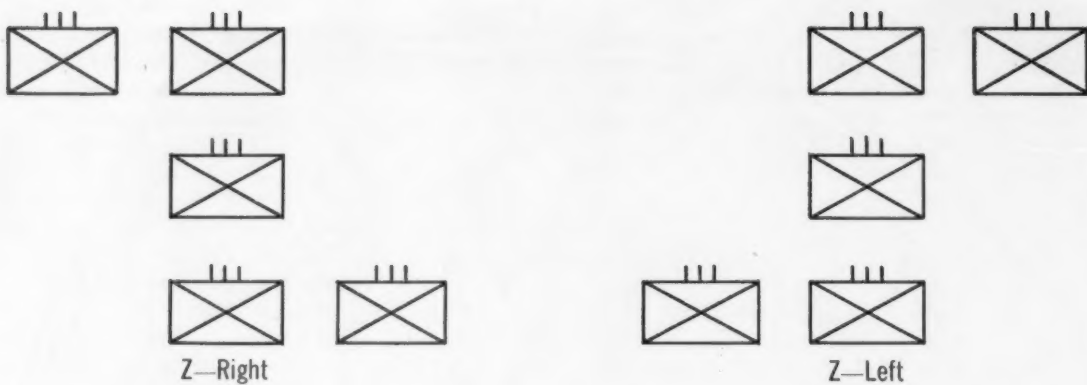


FIGURE 2. Formation must be capable of closing like a fist or extending like outstretched fingers



by the same nuclear explosion. Also, it gives the commander an area large enough in which to disperse and hide his unit so that it offers no lucrative target. A control area of this size is for reasonably open and gentle terrain. In wooded areas, mountainous terrain or otherwise difficult ground, the dimensions of the area would be smaller. The ruggedness of the terrain and the troop strength available are the guiding factors.

### Mobility in the control location

**SECOND REQUIREMENT.** In moving your division to an area from which you can accomplish your control mission, what factors do you consider?

**DISCUSSION.** In a mobile type of war, where troop units are widely dispersed, an enemy threat can come from any direction. Therefore, it is necessary that a commander who desires to control an area must so place his unit that he can with equal facility meet a threat from any direction. This means a central location must be conceived as more than merely a geographical position in the center of the area. Actually, the area chosen must be centrally located as regards *time* and *mobility*. Thus, a unit might be placed in the western half of its control area because the terrain is more rugged in that portion. Consequently, if the unit were located in its geographic center, it would take more time to travel to the extreme western end of the area than to the eastern. Schematically, this might be as depicted in *Figure 1*, where each arrow represents the same number of hours of travel. Let's call this the *control location*. Naturally, the principle remains the same regardless of the size of the unit.

A second major consideration in the division's movement is that it be mobile enough to move quickly to any part of the control area. Though we have mentioned mobility, dispersion and firepower almost in jest, they represent characteristics desirable in all units. The commander wants mobility, but he knows that with his battle groups on foot, mobility becomes merely a word. "On foot" does not meet the conditions of the nuclear battlefield. One simple consideration from unclassified nuclear data will show this point clearly. The negligible-risk radius for one type weapon is given as 1,700 meters. A simple computation reveals that troops on foot, moving across country, would have to walk for approximately one hour before they could get out of the danger area! This is absurd for troops of the world's most modern and motorized nation. On the other hand, if the battle groups were all mounted, the time to move out of the area would be reduced to minutes. Moreover, battle groups would be able to move to any portion of their control areas in time to intervene decisively without at the same

time exposing themselves unnecessarily. The lack of complete mobility is a deficiency in our current organization.

Now to a third consideration. The commander must know what is happening in his area; if he does not, he cannot control it. Accordingly, he plans on using his reconnaissance squadron. The inclusion of a recon squadron in each division seems predicated on a concept that visualizes a forward movement along one or more routes. In fact, it seems directed at situations such as existed during World War II. However, on the nuclear battlefield our division does not attempt to defend a front; it is attempting to control an area. This requires all-around reconnaissance. Therefore, each recon troop has to cover an area approximately 50 to 65 kilometers long. Clearly this is impossible. On the other hand, if there were three squadrons or a regiment, the area per squadron could be reduced to 12 to 17 kilometers across. This begins to approach reality. However, corrective action is impossible at so late a date except for special purposes.

### The intelligence lag

A fourth consideration the commander faces is a new one, and may be called *intelligence lag*. Basically, it involves these thoughts: The division must stop somewhere, even in nuclear war. It must set up its own security and be prepared to defend itself. However, it cannot stay long enough in one area to permit the enemy to spot it and thus invite nuclear strikes. How long, therefore, may it remain in one spot, providing it has moved undetected into an area and maintains camouflage discipline? The answer is a simple one: For no longer than it takes the enemy's intelligence system to arrive at an estimate that sufficiently convinces the Aggressor commander to authorize the use of nuclear weapons. However, this process consumes considerable time—approximately two to three days at a division headquarters.

A moment's reflection shows these things to be true: the enemy must suspect that a new unit is in a certain locality; he must reconnoiter to confirm his suspicion; he must determine the size of the unit; he must balance this against other threats facing him; he must do this through various channels of command; lastly, he must decide to fire. All these steps are time-consuming and create an intelligence lag. Even electronic gadgets cannot yet eliminate these steps, although every effort is being made to decrease the time required. Moreover, the time for the enemy to accomplish the intelligence can be prolonged by various security and camouflage measures on our part. Nevertheless, Aggressor cannot be pre-

vented from ultimately fixing a unit's location if that unit remains there for an extended period. Experience in previous wars bears out this truth to the point of making it self-evident.

The intelligence lag is a clue to a solution for avoiding devastating nuclear fires or at least minimizing the effect of such fires. The commander bears this in mind for later consideration.

### Organizing alert positions

**THIRD REQUIREMENT.** What orders do you issue to your staff to move the division to the place you have selected from which to effectively control your area?

**DISCUSSION.** The first order concerns the time of movement. A unit detected moving during daylight is in grave danger of nuclear attack. This is particularly true during the early phases of a war when nuclear weapons are probably more plentiful and will be used more readily in order to reach an early decision. Accordingly, the staff is directed to conduct the displacement during darkness and to make such a practice SOP. One departure is made from what was normal procedure during our last two wars. A most forceful order requires all sub-units to go into camouflaged positions one hour before daylight, regardless of any other consideration. The only exception tolerated is in event of actual contact with enemy forces. In order to define verbally these types of positions, they are given the most descriptive name possible: *alert positions*.

There must be some positive correlation between alert positions and the control location. This insures that our division can meet enemy threats prior to its being completely established in the control location. In particular, a formation must be chosen that is easily adaptable to either a defense or attack without major dislocation of units. In addition, the formation must be capable of permitting rapid dispersion. Once dispersed, the unit must be able to concentrate rapidly to take up either the offensive or defensive. Here note an important point: once the enemy is encountered, concentration of troops in immediate contact with him is feasible, because neither side can fire nuclear bursts without endangering its own troops.

Therefore, the formation adopted must be capable of closing like a fist or extending like the fingers of an outstretched hand. In addition, the formation must be easy to control so that it can move in the dark and be stopped or started with minimum difficulty. Such a formation with some of its maneuver capabilities is illustrated in *Figure 2*.

### Camouflage measures

The third order directs strict camouflage disci-

pline. This is vital, for during daylight our alert position must in no way be revealed. An alert position is rarely chosen in an isolated woods, for an enemy can create numerous casualties through blowdown. Consequently, each soldier must practice stringent personal camouflage measures. Prior to hostilities our division met this problem by issuing a camouflage cloth to each soldier. This cloth substitutes for the poncho and is mottled on one side to effect camouflage during spring, summer and autumn. The other side is white, for winter months. Of course, each major piece of equipment has its camouflage net.

Fire support during the move is dealt with in the fourth order. In order to handle the difficulties inherent in continuous fire support throughout a move, our division has distributed to all units an improvised, simple fire plan template. Basically, this is nothing but a base index and a series of concentrations. The firing data for each concentration are pre-calculated with reference to the base index. As units displace, their locations indicate which of the pre-calculated concentrations must be cancelled. When the mass of concentrations is no longer feasible, the entire template is adjusted and each concentration can be corrected by a constant factor. Though there are major problems of fire control, this procedure should assist in resolving them.

Finally, the commander orders all wire and telephone equipment turned in to the signal depot, except that used in CPs. If the division and its battle group are to use the intelligence lag concept, there will be no time for laying and picking up wire. Henceforth, all communication between battle groups and division will be by radio only. The increased use of helicopters for visits by staff officers and commanders should compensate in part for the lack of wire.

### Shifting the control location

**FOURTH REQUIREMENT.** Our division has reached its control location and adopted a Z-right formation. Approximately 36 hours have passed since it arrived in the control location. Aggressor recon drones have been seen over the area. Friendly reconnaissance indicates that enemy formations are approaching and will make contact within the next 24 hours. Darkness will come in about two hours.

As division commander, what do you do now?

**DISCUSSION.** Instructions are given for the control location to be shifted to a new area during darkness. In addition, the formation is changed from Z-right to Z-left. The specific intent is to change the location of the division's center of mass so that any intelligence effort by the enemy

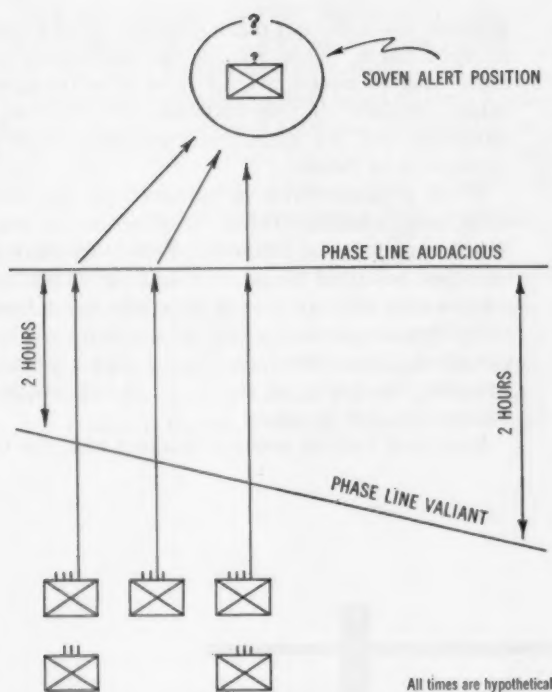


FIGURE 3. To control a concentration use phase lines

up to now is rendered valueless. Moreover, should Aggressor elect to fire with ground zero at the previous center of mass, the effect upon our troops will be minimized. In so far as possible, the intelligence lag is used as a device to nullify the effects of nuclear bursts. The principle of moving before the intelligence lag ends must be followed habitually.

#### Concentration upon the field

**FIFTH REQUIREMENT.** Now the division has reached its new control location. About 24 hours later you learn that enemy forces are approximately two miles to your front in what appear to be alert positions.

What do you do now?

**DISCUSSION.** The division will attack Aggressor in order to drive him from the control area. Necessarily, the decision is made on scanty information because the intelligence lag works both ways. However, the plan to establish contact denies both opponents major opportunities for using nuclear weapons.

The vital question is how to maintain dispersion until the last possible moment and yet be able to concentrate rapidly. This involves the use of a technique called *concentration upon the field of battle*. Though this is accepted military concept, it has been used in the past only sparingly, and then generally by armies or larger forces. It must be decided by the division commander quickly because almost no peacetime thought has

been given the principle. Basically, the decision is to give each battle group a direction of advance and a distance to advance; then, at a predetermined phase line, directions are so changed that all units arrive in the battle area at the same time. Control will be exercised by use of phase lines and numerous reports. Schematically, the advance to attack will appear as in Figure 3. Note that the advance is under cover of darkness, so due care must be given to allow for the slow rate of march.

#### Moving to a new control location

**SIXTH REQUIREMENT.** The enemy has been destroyed or is forced to withdraw. What is your action now?

**DISCUSSION.** Our division moves immediately to a new control location. Abandoned enemy positions are valueless because his defeat insures control of the area. To remain in his positions would be to reveal our location, and detection would be followed by disaster. Therefore, once again the advantages inherent in the intelligence lag are used and we move to a completely different control location.

OUR discussion actually grapples with the nuts-and-bolts features of the nuclear battlefield. They are problems which cannot be assumed away. They are unpleasant because their solution requires changing concepts that we have treasured and accepted on faith. Yet if we are to survive we must have the moral courage now to face the problems of the future. Unless we do, all the physical courage in the world will avail us only numerous and unnecessary casualties.

We have noted certain deficiencies in our current organization. The major one is a lack of personnel carriers in the battle group. The second is almost equally important: lack of reconnaissance both to insure security in the control location and to find the enemy, wherever he may be. Finally, there are deficiencies in our doctrinal concepts. We can no longer remain in a static type of defense; we can no longer make major moves during daylight; we must control areas; we must use the advantages inherent in the intelligence lag; we must use central locations in the light of time and mobility, and we must utilize the maneuver known as concentration upon the field of battle among divisions.

The solutions proposed are certainly not definitive, for no one can forecast the future with any degree of certitude. But we must not allow ourselves to be awed by the future. Rather, we must face it resolutely and mold our means to our needs. We must help the grasshopper change into an ant rather than merely give him meaningless advice.



**T**HE tank is a formidable weapon, but isolated from its supporting armor and accompanying infantry it is vulnerable.

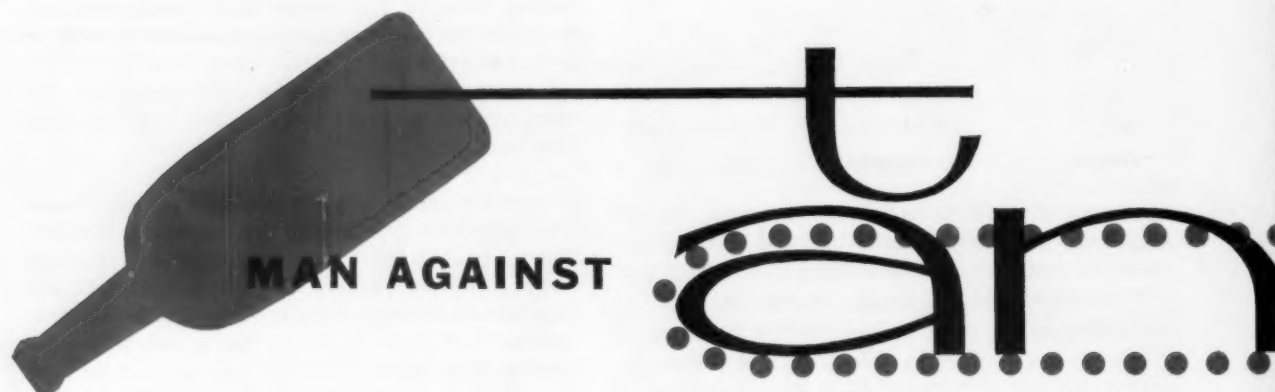
The 101st Airborne Division is teaching its troopers that ingenuity and courage can make every infantryman a tank-killer.

During the early phases of an airborne action, it is not enough to rely on M56s and 106mm recoilless rifles which are organic to the airborne battle group. It's no secret that the best defense against an airborne attack is a highly mobile shock force—usually armor, and airborne outfits don't have armor. Accordingly, the infantry squad must be able to kill tanks if it is to equalize the formidable advantage of the enemy's armor capability. Major Lewis L. Millett, Com-

mandant of the 101st Airborne Division's Recondo school, helped develop some solutions to tank fighting. Millett, who had worked with armor during World War II, climbed into a tank, buttoned up, and had Captain Arnold Asp, his assistant, mark its blind spots with chalk. They then applied this information to the Soviet T54 and T10 tanks so as to determine exactly where a Russian tanker is blind when buttoned up. They compiled a list of some of the weaknesses of these tanks—especially those of interest to infantry: how their routes are restricted to passable terrain, difficulties in camouflaging, their noisy motors, and limited visibility when buttoned up.

When a tank's crew is buttoned up, the driver must keep a sharp eye on the direction of travel. When engaged, the gunner and the loader are preoccupied with the target and loading. The tank's commander is busy trying to guide his driver in the direction of the target. Even if all the crew are alert, those blind spots still exist, generally opposite the route of travel or the direction in which the gun is aimed.

Realizing that in order to make a kill, the tank



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#### Learning the tanks' limitations

So far, nothing revolutionary. But pioneering began when Millett and Asp got the Recondo cadre out and had them practice sneaking in close to manned tanks. They quickly learned they could close in on the blind spot behind the tank's gun. They found that smoke or a white phosphorus

must detach itself from its supporting armor and infantry, the Recondo group came up with some sound tank-killing tactics, aided by some improvised but effective antitank weapons.

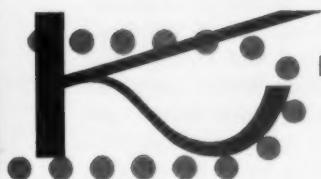
First came the Eagle fire bomb and the Eagle fire ball. The bomb is a greatly improved Molotov cocktail. A bottle is filled with gasoline and securely corked. An HC (smoke) or white phosphorus (WP) grenade is taped to the bottle's side. At 50 feet from the tank you pull the pin and heave the bottle, smashing it against the turret or deck. It does the double job of smoking and setting fire to the tank.

The fire ball is made from an empty caliber .50 machine-gun ammo box filled with napalm. A WP grenade or an M49 trip flare inside the box causes detonation. This charge will burn fiercely after exploding, dripping down into the engine and blocking air intakes for both crew and engine. The crew is smothered and the tank stops. Rubber bogie wheels also can be set afire by this charge.

Pole and satchel charges are effective improvised tank-stoppers. They can jam the turret or blow off drive sprockets and treads.

The rocket ambush was developed during World War II. A 3.5-inch rocket launcher round is buried in a roadside bank. It is connected with a radio battery in such a way that a tank will fire it into its own side by touching a trip wire laid across the road.

The Daisy Chain, another modification of a device developed in that war, consists of three mines buried five feet apart and wired together by a piece of detonating cord. The trooper conceals this beside the road, attaches a long wire or cord to the chain of mines, conceals himself 50 to 100



Lt. HAROLD C. LYON, Jr.

feet away, and pulls the chain across the road just as the enemy tank reaches the position.

#### Bolo bomb is double trouble

The idea of the Bolo Bomb came from World War II captured German training films. This device is made up of two AT mines, a detonating cord connecting both mines, blasting cap, time fuze, igniter, and a rope long enough to permit the mines to hang on each side of the tank. One mine is thrown over the tank while the one with the blasting cap is held and actuated. The trooper then moves out and takes cover. The effect of the double detonation in this arrangement is devastating.

The 40-pound shaped or cratering charge usually used to destroy bunkers can be effective against tanks. The trooper digs the charge into a road bed, base of the cone of the shaped charge facing up. It is then rigged with a trip wire and igniter system so that the tank, when directly above the charge, fires it into its own thin belly armor, blowing the turret completely off. A sort of armor hara-kiri.

Troopers of the 101st are also taught to use thermite grenades with grappling hooks attached to keep them from rolling off the tank.

### **Ingenuity aids antitank warfare**

With a little resourcefulness, our soldiers can improvise many effective antitank weapons from materials organic to their units. The imaginative Recondos have even considered the possibility of greasing a road used by tanks, or icing it in winter. At a curve or at a cliff's edge this might prove very effective.

Armed with his rifle, smoke and AT grenades and launcher, and enough ingenuity to make one of the weapons described, the infantryman can engage and defeat tanks.

Tank-killer teams of the 101st Airborne Division are organized into two groups. X-ray Team (the assault element) is a TOE fire team carrying rifles, AT grenades, rifle and hand smoke grenades, satchel or pole charges, Eagle fire bombs and balls, thermite grenades, and fuzed mines. Yoke Team (the security element) is a TOE fire team with a two-man 3.5-inch rocket launcher. It carries the same equipment as X-ray.

The equipment the tank-killer team carries depends, of course, on the mission and the availability of materials for expedients.

Basic tactics are used by the 101st tank-killer teams. When he spots a tank, the squad leader develops his plan of attack. Yoke fire team becomes the security force, with the mission of covering X-ray (the assault element) by fire, causing the tank to button up, destroying supporting infantry, and firing on and hampering the enemy tank's visibility. The assault force moves in, utilizing all available cover and taking advantage of the tank's blind spots to place charges and fire bombs. When the tank has been knocked out, the assault team withdraws under cover of the security element.

### **Utilizing the one-two punch**

If surprise has been lost by the time they move in for the kill, X-ray element throws additional smoke of its own. Once the assault begins, the entire action should last no more than three to five minutes. It is best to have radio communication between the two teams, but visual signals will do. If possible, Yoke team employs its 3.5 rocket launcher to disable the tank. When it does, it is followed up by X-ray which can move in to complete the kill. The teams never overlook the use of friendly artillery to isolate enemy infantry from their armor, cause the tanks to button up, smoke the area, and cover the withdrawal.

When they are used offensively as patrols behind enemy lines, the best places for tank-killer

teams to hide are areas impassable to armor, such as swamps and woods. They can remain concealed during the daytime and emerge at night in guerrilla fashion to prey on unsuspecting tanks. Tank-killer teams may be planted in such impassable areas that are unsuitable for airdropping or airlanding by conventional aircraft, through Recondo-developed helicopter rappelling. This is a method of descending from ropes hanging from hovering helicopters. When troops are slipped in in this manner, the enemy doesn't suspect they have left the helicopters since the copters haven't landed. By using this method troops may be planted in any type of terrain regardless of thickness of cover.

### **Weapons are the only means**

In addition to these tactics and training in improvising expedient AT weapons, troopers are taught not to panic, or abandon defensive positions that may be overrun by enemy tanks. Each man must remain in his foxhole. Protected by it, he allows a live tank to run over him. When the tank has cleared him he rises and heaves a dummy Eagle fire bomb or satchel charge onto the tank's rear deck. Troopers are also taught to construct a dual-purpose position which offers overhead protection against artillery fire and at the same time is an open foxhole from which they can battle tanks but the tank's weapons cannot get to them.

The course of instruction runs to 11 hours. One hour is devoted to the characteristics of Soviet armor to include their vulnerable areas, blind spots, and mechanical limitations. This hour includes the experience of being run over by a tank while in a foxhole. The second hour covers the fabrication and use of expedient AT weapons. During the third and fourth hours the soldier learns by actually making and using these expedients. Classes are divided into groups, using the County Fair system of instruction. The fifth hour deals with tank-killer tactics. After these five hours students are expected to conduct a six-hour helicopter-borne tactical patrol during which they encounter tanks and apply the tactics they have been taught.

Infantry tank-killer teams must be exceptionally aggressive and highly trained in patrolling. The types of soldiers our Ranger school and the Recondo school turn out make expert tank-killer teams.

The 101st Airborne Division's revolutionary tank-killer training may not be the perfect answer, but General Westmoreland has taught his airborne troops that infantry *can* defeat armor. What's more, this tank-killer training generates plenty of constructive thought.



## TACTICS AND THE THEORY OF GAMES

IN August 1942, General Vandegrift's First Marine Division had established a perimeter defense around the Lunga Point area of Guadalcanal. Within the Marines' lines was the highly-prized airstrip later known to the world as Henderson Field. To the east, and possibly to the west, were Japanese forces of unknown strength. Vandegrift faced an interesting tactical problem.

He could carry the battle to the enemy by sending one of his five rifle battalions across the Tenaru River on the eastern side of the perimeter. On the other hand, he would need every available man in his defense if the Japs should attack, and it was possible that a Japanese assault could be launched at any time from the west. By waiting in place and patrolling, he would gain time, his defenses could be improved and his patrols could gain information about the Jap forces. Vandegrift decided to wait.

Also in 1942, in far-away Princeton, New Jersey, work progressed on a book to be called *Theory of Games and Economic Behavior*, which was soon to introduce generally a mathematical concept of strategy known as "the theory of games." The book's authors were John von Neumann, brilliant young mathematician later to become a member of the Atomic Energy Commission, and Oskar Morgenstern, economist and commentator on defense policies. The precise applications of game theory to infantry tactics have yet to be determined, but some of the more simple aspects of the theory can be illustrated in terms of General Vandegrift's actions at Lunga Point and the Battle of the Tenaru.

At the outset it is necessary to assign some numerical value to each of the alternatives presented. We shall consider plus (+) values to represent U. S. gains and minus (-) values to represent U. S. losses. If we assume that a successful U. S. attack across the river would destroy the Japanese force there and set the stage for a drive to the east, we may assign it a value of +3. If such an attack were stalled, however, it would gain nothing and the U. S. defenses would be dangerously weakened, particularly if the Japs should attack from the west. To this situation we assign a negative value, -2.

If neither Vandegrift nor the Japs attacked, there would be no action: value zero. The remaining alternative—holding and improving defensive

positions—has some advantage and is assigned a value of +1.

All of this is represented graphically in the following diagram. The Japanese alternatives are: (1) to remain in position or (2) to attack, as shown in the first and second columns. Our alternatives are: (1) to attack in battalion strength across the river or (2) to hold and improve our defensive positions, as shown in the top and bottom rows. The numerical values shown indicate the result at the point where an alternative of one side intersects an alternative of the other.

		JAPANESE	
		Hold (1)	Attack (2)
U.S.	Attack (1)	3	-2
	Hold (2)	0	1

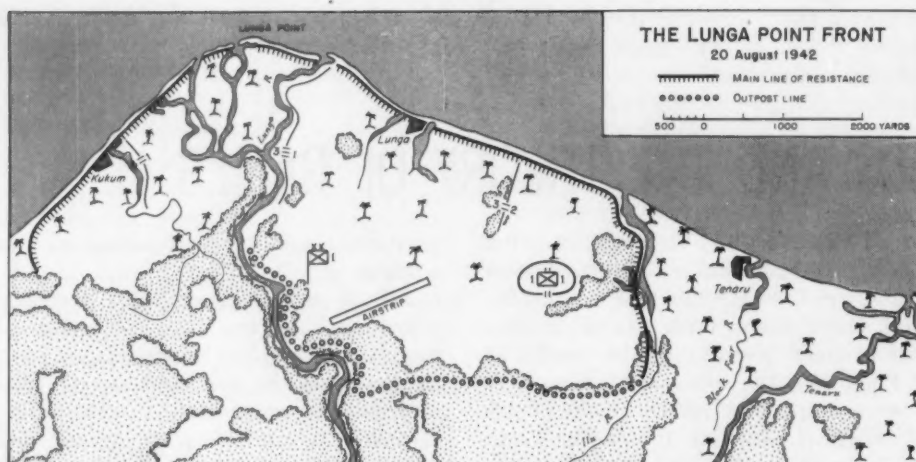
Stepping back for a moment to generalize, we can see that this particular tactical problem has certain characteristics common to other tactical situations and to contests of strategy generally. Among these are:

(1) Alternate courses of action. Each force may elect to take either of its alternatives at any time.

(2) Imperfect information. Each force may be aware of the other's capabilities, but neither knows for certain what the other will do.

(3) Interdependence. A course of action can be evaluated only in terms of the countermove of the other side. A U. S. attack may be one thing if the Japs merely defend and quite another if they counterattack U. S. positions from the west.

These characteristics indicate that an advantage results from the combination of imperfect information and the flexibility inherent in two possible courses of action. If either force were to elect one course or the other absolutely and the other side were to learn of it, the result



could be disastrous. For example, if Vandegrift knew that the Japs would not attack, no matter what, he could immediately launch the attack himself. If the Japs knew that the U.S. was attacking with one battalion across the river to the east, they could select that moment to mount their own attack against the U.S. perimeter from the west.

For the purposes of illustrating this problem, a "strategy" is the method adopted by each of the forces for choosing from the two possible courses of action available to it. A complete strategy is a predetermined system for making the choice under all circumstances, regardless of which course of action the other force may take. For example: a decision to hold under all circumstances (never to attack) would be a complete strategy, although obviously a poor one because of its inflexibility and because of the possibility that it would be detected by the enemy. It would be possible to have a complete strategy of variously holding and attacking in any sequence or ratio over a period of time. Within this plan of overall strategy, the ratio could be controlled even though the decision at any particular time were made by some process of random selection. To illustrate: if the complete strategy were to vary holding and attacking on a 50-50 basis, the decision at any particular moment could be made by flipping a coin, and over any representative period the ratio would still be 50-50. If the complete strategy favored holding over attacking by a ratio of five to one, the individual decisions could be made by casting a die with the "one spot" signalling an attack and each of the other faces signaling a decision to hold. In this way the enemy could never be sure what was going to happen at any particular time; even to learn the strategy of the opposing force would be of no advantage to the enemy.

The theory of games suggests that in certain situations it is possible to adopt a complete

strategy which will maximize gain and minimize loss regardless of the strategy employed or particular action taken by the opposition. There is, in other words, an optimum way "to play the game." It is possible, at least theoretically, to apply game theory principles to any "game" characterized by alternate choice, imperfect information and interdependence of action, whether the opposing forces meet across a poker table or a battleground.

To return to the problem which confronted General Vandegrift, it is necessary to adopt a shorthand method for solving it as a problem in game theory. Such a method has been introduced in a book called *The Compleat Strategyst*, a Rand Corporation research study by J. D. Williams. It is this method which will be employed here. Without attempting to develop the mathematical processes underlying the theory, this article will use the Williams method to determine optimum strategies, the solutions to a game theory problem.

The diagram on page 79 shows certain subtractions which may be made in order to determine odds or relative frequency indicators. The odds (numbers outside of the square) indicate the relative frequency with which each course of action should be employed in the optimum strategy for each side.

Note that by subtracting the numerical values assigned to one course of action we obtain a number, the difference, which indicates the relative frequency with which the *alternative* course of action should be selected. Thus, the diagram indicates that General Vandegrift should favor holding in place by odds of 5 to 1. More precisely, it really indicates that if the decision is to be made 6 times, Vandegrift should hold 5 times and attack once. The diagram also suggests that in the same 6 instances the Japanese should attack 3 times and hold 3 times.

Advantage to the U. S. in following the indicated 1 to 5 strategy may be checked by a few

simple calculations to obtain a figure which we shall call the "value of the game." This term is used to designate that result which a force is certain to achieve if it follows its optimum strategy, regardless of what the other force does. Thus, the value of the game is an average which the best strategy of one side will yield against any course of action taken by the other.

In the example we have used, we first test the U. S. strategy against Japanese attack:

$$\frac{(1 \times -2) + (5 \times 1)}{1 + 5} = \frac{-2 + 5}{6} = \frac{3}{6} = \frac{1}{2}$$

And tested against holding, the alternative course of action open to the Japanese, we find that the U. S. strategy yields the same result:

$$\frac{(1 \times 3) + (5 \times 0)}{1 + 5} = \frac{3 + 0}{6} = \frac{3}{6} = \frac{1}{2}$$

From this it is seen that regardless of what the Japs do, the U. S. will consistently win, i.e., the game will result in a positive value of  $\frac{1}{2}$ , so long as the U. S. continues to vary holding and attacking in the ratio of 1 to 5.

We may now experiment to see how the value of the game is changed if the U. S. adopts a different strategy. Remember that in the following calculations a resulting plus value indicates a gain for the U. S. and a loss for the Japs and a minus value indicates a loss for the U. S. and a gain for the Japs. Let us assume first that the U. S. adopts a 3 to 3 strategy similar to that to be employed by the Japanese. Tested against the Japanese alternative of holding, we see that this strategy works better than the first strategy tested:

$$\frac{(3 \times 3) + (3 \times 0)}{3 + 3} = \frac{9 + 0}{6} = \frac{9}{6} = 1\frac{1}{2}$$

But if the Japs should elect to attack, the result would be quite different:

$$\frac{(3 \times -2) + (3 \times 1)}{3 + 3} = \frac{-6 + 3}{6} = \frac{-3}{6} = -\frac{1}{2}$$

Against this U. S. strategy, it is clearly to the Japs' advantage to attack, and if they were to discover it, they would probably attack continuously. To the extent that they did, they would win consistently in the same measure that the U. S. wins consistently by following their 1 to 5 strategy.

Just for contrast, let us see what the results would be if the U. S. reverses its strategy to favor attacking over holding by the ratio of 5 to 1. From the first calculation it is apparent that this strategy will succeed if the Japs hold:

$$\frac{(5 \times 3) + (1 \times 0)}{5 + 1} = \frac{15 + 0}{6} = \frac{15}{6} = 2\frac{1}{2}$$

But the second calculation demonstrates the weakness of this strategy in the event that the Japs attack:

$$\frac{(5 \times -2) + (1 \times 1)}{5 + 1} = \frac{-10 + 1}{6} = \frac{-9}{6} = -1\frac{1}{2}$$

		JAPANESE				
		Hold (1)	Attack (2)			
U.S.	Attack (1)	3	-2	1	5	
	Hold (2)	0	1			
		3	3			
		U.S.		JAPANESE		
		3 - (-2) = 5		3 - 0 = 3		
		0 - 1 = -1		-2 - (+1) = -3		

It is true, of course, that these figures merely present in numerical form—and a somewhat artificial form at that—the factors which General Vandegrift must have considered in making his decision intuitively on the basis of experience and judgment. Vandegrift knew that the maximum gain was to be achieved by an attack, but he could not be sure that the Japs would not counterattack the western side of his perimeter, and he realized that his position would be dangerously weakened in that event. Because the outcome was so dependent on what the Japs would do, and because Vandegrift could not know this for certain, he adopted a course of action which would minimize the possibility of loss, even though it limited his possible gain. This is really the basic equation of game theory and the core of any strategy.

Until introduction of the theory of games, there was no mathematical tool for the analysis of situations involving opposing strategies, imperfect information and interdependence. In the game of poker, for example, probability calculations could be used to find out how often a straight flush might occur, but they were practically useless once betting had begun. It remained for the theory of games to consider how frequently a player should bluff.

Although game theory generally begins where probability leaves off, problems in game theory frequently do involve probabilities. A good illustration is the duel where two men with loaded pistols turn and advance toward each other—one of the simplest strategic situations. This involves balancing the advantage of waiting until the range



is shorter and the probability of scoring a hit correspondingly greater against the disadvantage of possibly being shot while waiting. The same considerations are inherent in other duel-type problems whether the contestants are men, tanks or missiles, and such duel-type problems are capable of being solved with exactitude by game theory if the probable accuracies of the duelists at various ranges are known.

Other possible applications of game theory to warfare are limitless. Camouflage and dummy emplacements are deceptive strategies serving the same function in warfare that bluffing does in poker. Feint attacks and the deliberate employment of dud shells are in the same category. To the extent that these tactics cause the enemy to scatter or misdirect his effort or to expose himself, they serve a useful purpose, but their value may be greater or less depending on how effectively they are employed. The air-sea search problem, the antisubmarine warfare problem, the pattern of defensive supporting arms fires and harassing and interdiction fires are other examples. In each of these and in countless other instances there is a possibility of successfully applying game theory principles to determine the optimum method of employment.

But to continue with General Vandegrift's situation on Guadalcanal. The Marines on the perimeter dug in. At the mouth of the Tenaru, where a sand spit ran into their lines, they laid in barbed wire entanglements, and elsewhere they burned off the high grass to their front. At about 0300 on the morning of August 21, 1942, the Japs struck. The first attack came with little warning. In all, about 200 Japs charged across the sand spit in screaming waves. Most of them piled into the barbed wire where they were finished off with heavy machine gun fire and 37mm cannon firing canister. But the eerie light of Jap flares and the stepped-up pounding of Jap artillery and mortars showed that a much larger force was present and that the attack was still on.

Shortly before dawn, the 1st Battalion, 1st Marines, was released by General Vandegrift from division reserve to the direct control of Colonel Clifton B. Cates, then commanding the 1st Marines. This battalion could be used to reinforce the line at the place called Hell Point where the battle was then raging, or it could be sent up river to cross the Tenaru and envelop the enemy from the rear.

The Japs could continue to force the battle at the point they had selected, or they could withdraw from the east bank of the Tenaru and mount a different attack another time.

To present this as a problem in game theory we must again assign numerical values to each alternative course of action. To the possibility of

the Japs continuing the attack at Hell Point against Marines reinforced by the reserve battalion, we arbitrarily assign a value of 1. To reinforce the Marine lines and force the Japs to withdraw is at least a temporary victory, and to that we assign a value of 2.

A successful envelopment of the Jap force still trying to funnel its troops into a limited area is also considered to be worth 2. But if the enveloping force can surprise the Japs during their withdrawal, the opportunity for a decisive action makes this possibility worth 3. All values are plus, i.e., they represent U. S. gains or Jap losses in the amount of the value.

On the type of diagram used before, the courses of action for each force and the assigned values of each possibility are as follows:

		JAPANESE	
		(1) Continue Attack	(2) Withdraw
U.S.	(1) Reinforce	1	2
	(2) Envelop	2	3

Because the values do represent U. S. gains and Jap losses, the U. S. will always be striving to obtain the highest value and the Japs always striving to hold the value lost to a minimum. For the purposes of this example, we may assume that each force will act rationally in pursuit of its objective with the knowledge that the opposing force will make the best move available to it. Thus, the Japs know that if they continue to press the attack their loss is limited to 2, but if they withdraw it is possible for them to lose 3 (in both instances if the U. S. envelops rather than reinforces). The U. S., on the other hand, knows that if it reinforces it is possible that it will be limited to a gain of 1, but if it envelops it is certain of winning at least 2.

Since the U. S. knows that the Japs will always act to minimize U. S. gains, the U. S. should adopt a course of action that will yield the *highest* minimum. And by the same token, since the Japs know that the U. S. will always seek to maximize its gains (Jap losses), the Japs should select the course of action which will insure the *lowest* possible maximum.

In some game theory problems it is possible to find a point where the highest minimum for one

side and the lowest maximum for the other will always coincide. This point is called a "saddle point," and when it exists its value will always be the value of the game, and it will always be to the advantage of both sides to adopt courses of action which intersect at that point on the diagram of the game.

The saddle point, if one exists, is found by noting the minimum value in each row (the best result for the Japs in either course of action by the U. S.) in order to find the *highest minimum* value. Then note the maximum value in each column (the best result for the U. S. in either course of action by the Japs) in order to select the *lowest maximum* value. The saddle point occurs where the low maximum and the high minimum coincide.

As the example at the bottom of the page demonstrates, the Japs should always continue to press the attack and the U. S. should always attempt the envelopment. The value of the game is 2.

Back in the first example we saw that as long as one side holds to its best strategy the value of the game remains constant regardless of what the other side does. This is not true, however, of games which have a saddle point. In saddle-point games, any deviation from optimum strategy will change the value of the game, and the side which deviates will always be penalized. By checking the saddle-point diagram here it can readily be seen that the U. S. gains will be limited if the U. S. ever elects to reinforce, and Jap losses will be increased if the Japs withdraw.

Those familiar with the Guadalcanal campaign may recall what did happen at the Battle of the Tenaru. A Marine battalion hacked its way through the jungle to a successful envelopment of the Japanese. As the Japs continued to mount their attack, they were engaged from the rear by the enveloping force and driven into a pocket be-

tween the river and the sea where they were annihilated. The battle ended about 1700 on August 21, 1942, after some 16 hours of continuous fighting. From the original Japanese force of nearly 900, there were no survivors.

Although the Tenaru fight lends itself readily to game theory analysis, we may well inquire what effect the theory could have had on the command decisions made there and, more importantly, what real value the theory might be in making other tactical decisions. It is true, of course, that command decisions often are individual, highly personal, and not susceptible of rigid analysis. The best decision may rest on one commander's estimate of the probable timidity or inertia of another, rather than on the assumption that the second commander will make the best rational selection from the alternatives available to him. It is also true that the outcome of battles may be determined by chance and that other elements outside the knowledge and control of both commanders can be unexpectedly decisive.

But these considerations indicate only that for one reason or another it may not make much sense to try to apply the theory of games to a particular tactical situation. They do not suggest that game theory cannot be applied to tactical situations or that the theory does not have value for this purpose.

Combat, like baseball, can be "a game of inches," and as long as the ability to make the right command decision remains as elusive and as valuable as it has always been, anything that might offer help to the commander is worthwhile. It seems reasonable that both analyzing a tactical problem as a "game" and evaluating the factors on which his decision is based, may clarify the problem in the commander's mind. If this is true, game theory has value for that purpose. But entirely aside from the theory's direct application, it seems possible that the discipline of game theory thinking may have a transferable value in the same way that the study of Greek or Latin, or even the practice of close order drill, is said to be useful.

At least game theory is provocative, and we do not know where it may lead. Until we do, it will continue to have the lure of the unknown—particularly for the professional soldier who seeks to eliminate or reduce guesswork in an uncertain business. That should be justification enough for continuing to work with the theory. It is not necessary to be as confident of its military application as was an Air Force spokesman who said a few years ago: "We hope it will work, just as we hoped in 1942 that the atomic bomb would work."

		JAPANESE		
		Continue Attack	Withdraw	
U.S.	Reinforce	1	2	1
	Envelop	2	3	2*
		2*	3	

Column Maximum

*A curriculum which airlifts a man from the confines of his service to a plateau of national interest . . . A climate which gives a student the opportunity to express his own convictions without fear . . . A spirit in which competitive discussion is used as a device for creative thinking . . . An educational process where growth of the student depends in some measure on a studied degree of con-*

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# National Strategy Seminar

A guest reports on the intellectual give and take of the Army War College's famous National Strategy Seminar

CHARLES S. STEVENSON

THE U.S. Army's National Strategy Seminar at the Army War College, Carlisle Barracks, Pa., is the culmination of 44 weeks of hard study by Army officers selected to prepare themselves for high command and staff positions. In effect they are told at the beginning of the course to evolve a national strategy for the United States and a military program to support it. Divided into 14 committees, the students come up with 14 studies of the problem. Then comes the four-day seminar attended by some 100 selected American leaders. They are distributed equally through the 14 committees and begin the process of "murder boarding" and nit-picking the results of the committees' 44 weeks of work.

It was my privilege to have been assigned to Committee Six, which eventually won the coveted honor of developing the best strategy and program. While I can't say what went on in the other committees, on the basis of my experience with Committee Six, I do assume that some mighty fancy intellectual skirmishes took place.

## OLD HANDS AT READING BRIEFS

Lieutenant Colonel Adrian St. John, II, as the chairman of Committee Six, had the task of keeping a degree of order among the 23 assembled individuals, each with his own predilections and

ideas. If this number seems so unwieldy as to be a deterrent against any kind of accomplishment, it didn't turn out that way. St. John handled them superbly. We were first handed a 36-page draft of a proposed national strategy.

Mr. Karl G. Harr, Jr., Special Assistant to the President, took a professional thumb-run through the document and settled down to give it his undivided attention. Dr. Klaus E. Knorr, Associate Director of Princeton University's Center of International Studies, went to work like an old hand at reading briefs, marking occasional passages. Other guests started on the task after assuming postures of comfort and appearances of understanding. After a time Colonel St. John opened a critique of the draft.

## FREE DISCUSSION ENCOURAGED

It took only to page 2 to disclose that the Army War College encourages free discussion. An argument began just 306 words from the opening when someone wondered whether the nation's interests wouldn't be better served if the words "peaceful international" were deleted from the proposed National Purpose, which read: "To foster the development of a peaceful international community which is based on the rule of law, the dignity of man, a respect for diverse cultures, and the consent of the governed and in which the



United States can be secure and its people can progress spiritually and morally."

This dissenter seemed to think the committee had covered too much ground in going "international." Another thought "the development of a peaceful international community" a device which would help bring about the other aspirations.

The matter was never completely resolved. One member was muttering about the inclusion of "international" as he drove off after the last session.

There was no disagreement on the next subject: "The National Interest—to secure the United States and to ensure the spiritual well-being of and material prosperity for its people."

### A VARIETY OF OPINIONS

Matters were slowly or quickly resolved by a vocal Gallup poll. As the morning moved along, Colonel St. John suggested faster action. The group moved into the nature of the Soviet threat, the chances of a peacetime competitive co-existence with the USSR, the expansion of multilateral trade within the Free World, the Soviet satellites, how SEATO's organization could be enhanced, respecting India's national policy of neutrality, and other subjects.

Just before the guests departed to prepare for evening social gatherings, they were handed a 90-page booklet labeled SECRET.

"We will discuss this tomorrow," announced Colonel St. John. "Be here at 0830," after which he and his associates relieved the guests of the booklets. This document was the draft of the National Military Program. It covered just about all the waterfronts, the air lanes and the ground areas from Turkey to Taiwan, from Portugal to Pakistan, from Norway to Nepal, from Liberia to Laos.

Controversies arose on costs and budgets, and a great variety of opinions came out as to what kind of a war would commence if it appeared West Europe would be taken over by the Soviets.

Proposals concerning the terms of service of the President and members of Congress and a suggestion about reorganizing the Department of Defense chain of command evoked much heated discussion.

General J. Lawton Collins was a vocal but most considerate member of the committee. The former Army Chief of Staff had ideas on almost every subject and got a great response when he asked the students if they could argue with the faculty. In a spontaneous burst of enthusiasm they assured him wholeheartedly that they could. The General was a spokesman for directness and simplicity, suggesting that what had been included

under the headings of Interest, Purpose, and Goals be written on the first page, under one heading.

### THE TONE OF THE SCHOOL

These student-civilian committee discussions stop only long enough to hear the platform guest speakers, each of whom talked naturally about his field of interest. A rundown on several talks at the plenary session and the subsequent question-and-answer period further reflects the tone of the school. Occasionally the speakers get as much out of their talks as the students.

Secretary of Commerce Frederick H. Mueller, speaking on the all-encompassing title of "Psychological, Political and Economic Aspects of National Strategy," after describing the services of his department, said he felt the Government should *support* the national economy but not *control* it. He suggested that the savings of private industry are needed for expansion and indicated that the Government should, in the public interest, do only what is beyond the capacity of private industry. He mentioned upper-air forecasting as an example. His invitation to "throw him hot potatoes and curve balls" was quickly accepted.

### MANY PHASES OF NATIONAL POWER

William G. Murray, Professor of Agricultural Economics at Iowa State University, wanted to know if the Department of Defense had given any thought to speeding up the highways program in the interests of National Strategy. Arthur McDowell, Director of Civic, Education and Governmental Affairs for the Upholsterers International Union, asked if there is pressure by big business to sell non-strategic materials to unfriendly countries. O. Preston Robinson, Salt Lake City newspaper man, inquired what was being done to increase trade with Far East countries.

General L. L. Lemnitzer, Army Chief of Staff, analyzed the Communist threat as one without precedent in the world's history. General Lemnitzer put in a good word for Nike-Zeus, emphasized the new policy of the Army toward participation in civil defense, and outlined his idea of what an effective security force should be. He concluded with the caution that soldiers should never forget that there are phases of national power and strength other than the military.

One of the most gripping talks of all was the concluding one by our Ambassador to the United Nations, Henry Cabot Lodge.

Secretary of the Army Wilber M. Brucker, though not an official speaker at the seminar, did address the evening dinner of the sessions.

One of the honors given the selected committee, was, as stated, the privilege of presenting a concise outline of its positions to the assembled group in the two-part plenary type National Strategy Seminar on the last day of school.

Here again Colonel St. John was in charge. He was flanked around a crowded table by three of his military associates and two civilian guests of the committee, each of whom was to read selected and condensed portions of the winning Strategy and Program. He began:

"There are those in certain other committees who seem to feel that the selection of Committee Six was done by a secret formula, the main ingredients of which are dice and darts. I have reason to believe this is not true." The statement drew a round of good-natured, but unsympathetic applause.

The first part of the session consisted of reading from prepared text and occasional slides and passed with quiet and dutiful attention.

The second half of the session began with a tone of excited expectancy not unlike that of a sort of leading-the-lamb-to-slaughter hope. The committee must have had some feelings like this, too, because when it reassembled it had doubled its strength. Three more military men and two civilians had been brought in as reserves and were in a posture of alert around another table.

## NOT ALL IN AGREEMENT

Questions came politely but firmly and challengingly.

The questions about the proposed new Defense Department organization indicated plainly that not everyone was in agreement with the winners. It seems as if Army Chief of Staff Lemnitzer had two days previously mentioned a slightly different approach and there were some who agreed with him.

The committee's budget observations were scrutinized since it had suggested that as the gross national product of the country increased, we could afford to spend more money for defense. It was very careful, however, to let it be known that its recommendation was not based on this philosophy, but on one of need.

If "intellectual freedom" ever got a free rein, it was here. And this, of course, is probably the greatest thing about the school.

The students, particularly long, lean lanky Colonel Jack F. Wilhm, were more vehement than the civilians. It was obvious that they had taken to heart their first day's instruction to "say what you think . . . and think what you say."

As a matter of fact, some of the recommendations and remarks of the committee were of such an advanced nature that the genteel and scholarly

looking General Palmer announced in the middle of the discussion:

"I'd like to repeat that this is a privileged session and that the remarks and recommendations being made and said here are not to be considered those of the War College."

## WHAT HAPPENS TO RECOMMENDATIONS?

Every committee paper is carefully reviewed by members of the faculty and by the course directors. Outstanding papers or portions of papers are read by the more senior Faculty Group Chairmen.

Papers that in a university would be awarded the stamp of *honor* are studied by the Deputy Commandant. Such papers serve a variety of uses. For example, Course Directors may introduce them into the bibliography of future courses. The College's Advanced Study Group finds them a constant source of invigorating ideas. The Commandant may decide that ideas and suggestions of particularly outstanding papers should be made available for consideration by the Pentagon.

As to the Strategy and Program papers submitted at the end of the last course of the year, although they have been drafted, researched, discussed and written by newly formed committees, a majority of ideas and recommendations made in them have been covered in varying facets of earlier courses. This is a quite natural order of events, for the courses at the Army War College are viewed as a series of related stepping stones which lead to the national strategy and its supporting military program. These papers are not considered a solution in the completely finished sense; they are only studies made of the problems involved.

"Provocative, creative thinking on the part of the student, the broadening of his personal horizon beyond his immediate profession to include matters concerning international affairs, economic and sociological problems and the like, plus the consideration of complex military problems at the joint, combined and allied levels are our main concern," said a faculty member. Pausing a moment in reflection, he continued.

"I suppose that you might say that our job, in a sense, is one more of the development of the officer than a search for specific ideas although of course we are particularly sensitive to the latter. When the student leaves us we want to be sure that he understands the value of self-reliant independent thinking, even though at times he may have a problem in presenting original and particularly contradictory thoughts. In the long run, this is the democratic and American way. Our officers must be imbued with this spirit if they are to give the country the leadership we expect of them."

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# Combined Arms Battle Force

*It's possible, so why not now?*

Captain WILLIAM M. GLASGOW, Jr.

THE late General "Hap" Arnold once said: "If we fail to keep not merely abreast but ahead of technological developments, we needn't bother to train any force, and we needn't make any plans for any emergency expansion. We shall be totally defeated before any expansion could take place."

While you might consider this eminent airman's view too extreme, you must admit that organization and tactics have not always kept abreast of improved weapons. It may pay us to examine our own standing.

During our lifetime we have seen many new weapons devised, with successively greater man-killing potentials. These have evolved into low-yield nuclear weapons with improved battlefield mobility and delivery means. Even a cursory examination shows that our own current organizational and tactical concepts have not kept pace with weapons developments. More than a year ago, before he retired as Commanding General of USCONARC, General Willard G. Wyman indicated that we would need to modernize our organization within two years. Time is running out.

The need for new organization and new tactical methods becomes clear to the professional soldier when he considers his newest fighting tools and the various other pieces of up-to-date materiel that supplement them. Our fighting divisions are not fully equipped to meet the Pentomic concept. While we have not completely modernized since World War II, our major enemy has undergone two re-equipments. We, the world's richest nation, can field an army only a poor second in equipment, not to mention manpower, to our greatest rival. We cannot afford such complacency.

It's no secret that the Reds can match our airpower. While we still lead on the sea, we are greatly outnumbered in certain types of warships. The USSR's submarine force greatly outnumbers ours. In missile technology the Reds have moved ever forward, to our chagrin.

This power gives the Soviet Union and its satellites the back-up they need in power politics. Their vastly superior ground forces can be used there to advantage. The USSR has, or soon will have, the ability to produce stalemates in intercontinental warfare while making limited attacks on weak areas through the use of these superior

land forces. Not a pleasant situation to contemplate, especially when we consider the strength of Communist manpower. Fortunately for us, things are far from hopeless—if we act now. By combining far-reaching reorganization and tactical innovations with the modern improved weapons that science gives us, we can reduce the Communists' advantages by making novel gains in the use of our ground power.

History clearly shows that organization and tactics evolve slowly. During World War II the Germans demonstrated the great potentials of far-reaching thought and action by welding new weapons and new organizational and tactical concepts. Their achievement in 1940 shows what can be accomplished by tying new weapons to revolutionary organization and tactics, and may indicate the path our future actions must follow.

## A COMBINED-ARMS BATTLE FORCE

Today's technology establishes the need for combined-arms battle groups that can attack or defend over wide areas of land. While the concept of separate combat arms and services may die slowly, improvements in weapons and other equipment will surely force us into a true one-branch service. Why not do it now?

Let's look at weapons and equipment and see if a combined-arms battle force is possible.

Armored cavalry units have paved the way for a combined-arms set-up. The platoon leader heads a combined-arms team of two light tanks, two scout sections in quarter-ton trucks, one infantry squad in its armored personnel carrier, and one 4.2-inch mortar section whose weapon is mounted on an M84.

The commander of an armored cavalry battalion also leads a combined-arms team. He has five companies: three reconnaissance companies each having three of the platoons we have described; one company of 17 medium tanks; and a howitzer company with its 105mm SP guns.

An armored cavalry regiment of three battalions has extensive firepower and mobility, but lacks the bulk necessary for sustained combat. Its heavy equipment cannot seriously be considered for an airdrop attack, even when reorganized under its series D TOE. The current organization of the armored cavalry regiment also precludes

*Grumman Aircraft Engineering Corporation  
salutes the delegates to the annual meeting of  
the Association of the United States Army and  
the Army Aviation Association of America  
meeting in Washington, D. C.*



### *New Seeing Eye for the Army...*

Here is the Army AO1 Mohawk that will soon spot, mark, and photograph targets with the assistance of the most modern electronic equipment. Powered by twin turbo-props, this highly maneu-

verable Army airplane affords its two-man crew every possible tool for observation and surveillance. Added to this is its short field capability and its simplicity when maintenance is required.

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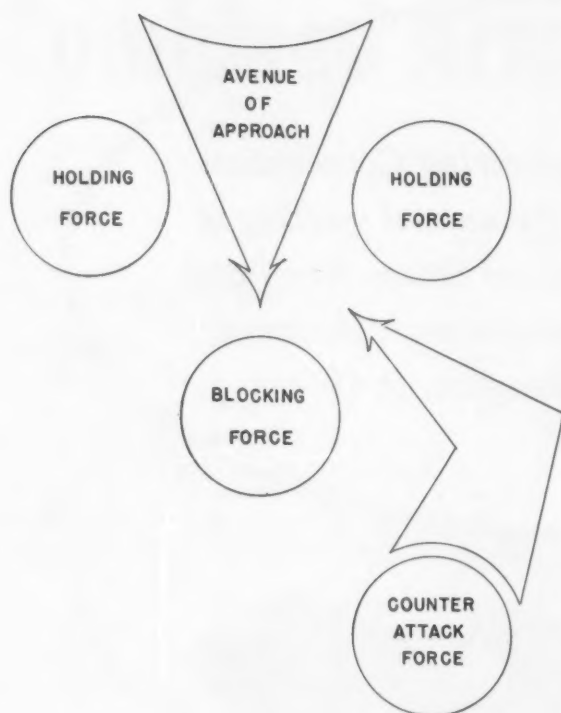


Figure 1

the use of the newest and most potent means of delivering heavy destructive artillery fires at maximum effective ranges. Any unit's fighting area is confined to the range of its organic supporting weapons.

### THE CONCEPTS OF ODDS AND EVENS

The Pentomic concept evolved as an uneven number of units adaptable to the requirements of both attack and defense. A concept of fours has always proved ideal for defense, but no even number of units lend themselves to control during the attack. The human element comes to the fore and we see a share-and-share-alike system. When attacks are made in line, tactics are ineffective, with a resulting hi-diddle-diddle motion right up the middle. But the use of units in defense allows for two to force an attacking enemy into a channel, one to serve as a block, and the fourth to counterattack. (Figure 1).

The concept of threes has proved best for an attack. It allows for easy control, an adequate reserve, and a variety of maneuvers (Figure 2). We admit it is not so readily adaptable to the defense as is the concept of fours. Therefore, a concept of fives—the smallest and most workable odd number—seems a logical compromise organization for the battle group. Such a concept probably will be with us for some time.

Any new combined-arms battle groups can easily fight on a concept of five. Naturally, our

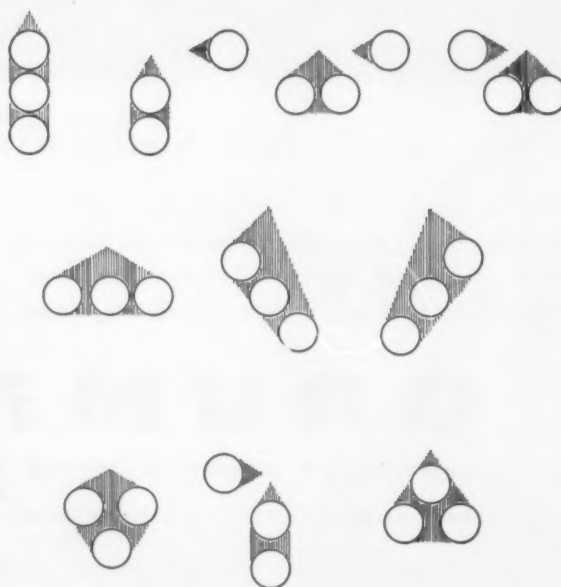
five basic units would be composed of those fighters who were formerly called infantrymen; in our new battle group they are simply combat soldiers (Figure 3). The hand-carved artillery support of our basic five units works in the same way as do our current weapons squads and platoons. These new weapons lengthen the reach and increase the destructive capabilities of our basic tactical units. Each of these units can be independently air-supported within the range limitations of the battle group's organic heavier artillery and aircraft. To increase mobility in the battle area, companies are allotted organic Mechanical Mules for hauling heavy equipment and ammunition. Besides being easily air-transportable, and thus augmenting the unit's air mobility, the Mule also lightens the soldier's load.

### FIRE SUPPORT AND MOBILITY

For engaging in sustained combat over the widest possible areas, the battle group's five basic workhorse units require supporting artillery and air mobility. These allow us to seize the most ground with the least number of men. Air mobility is also a rapid means of assembling and exploiting, allowing for maximum dispersion—a most desirable factor in the face of mass-destruction weapons.

To provide its own artillery support we may equip the battle group with a battery of Little John. Little John is air-transportable. It readily fits into our concept of a combined-arms battle group and enables such a unit to attack or defend an area of 300 square miles with adequate

Figure 2





CREATIVE ELECTRONICS FOR DEFENSE



# STRANGE "FISH" UNDER THE POLAR ICE

## Revolutionary RCA Magnetic Video Tape Recorder to Speed Navigation Training of Submariners

Aboard the nuclear submarine Sea Dragon, the first undersea magnetic video tape recorder will record and store data on under-the-ice characteristics from externally installed TV cameras. Upon return to base the recorded information will be displayed for the benefit of undersea service trainees.

The RCA undersea recorder is a marvel of compact design (dimensions 20" x 20" x 100"). It nestles in a torpedo rack, and represents a 60% space reduc-

tion over existing video tape equipment.

Among the exclusive RCA developments are: the now famous "Tiros" satellite recorder; a radar system designed to take the first pictures of a nose cone re-entry vehicle; a unique tape cartridge completely adaptable to any size recorder. For literature describing new RCA defense and commercial products developments, write Defense Electronic Products, Radio Corporation of America, Camden, N. J.

*Out of today's defense needs...tomorrow's electronic advances*



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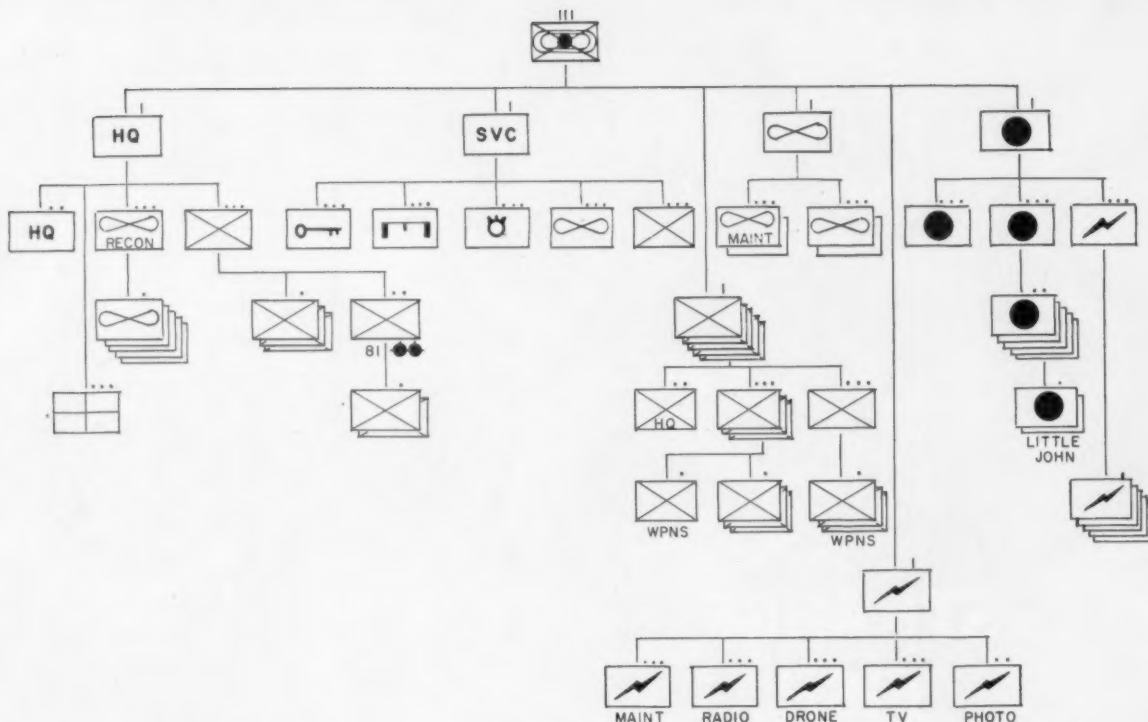


Figure 3

general support fires. Much greater areas could possibly be covered by Little John in a direct support or attached role.

When we speak of areas of 300 square miles we visualize the necessity for air mobility. It is the only means by which we can rapidly occupy such an area. To provide its air mobility we allot the battle group a company of H-34s. Two platoons, each with five of these helicopters, allow nearly a two-company lift when all aircraft are fully operational. Maintenance is always a headache with VTOL aircraft, but this difficulty is being overcome in improved design. However, two maintenance platoons in the aviation company could provide adequate first-, second- and third-echelon maintenance for the two flying platoons and the other aircraft that are dispersed throughout the battle group.

#### COMMUNICATIONS ALL THE WAY DOWN

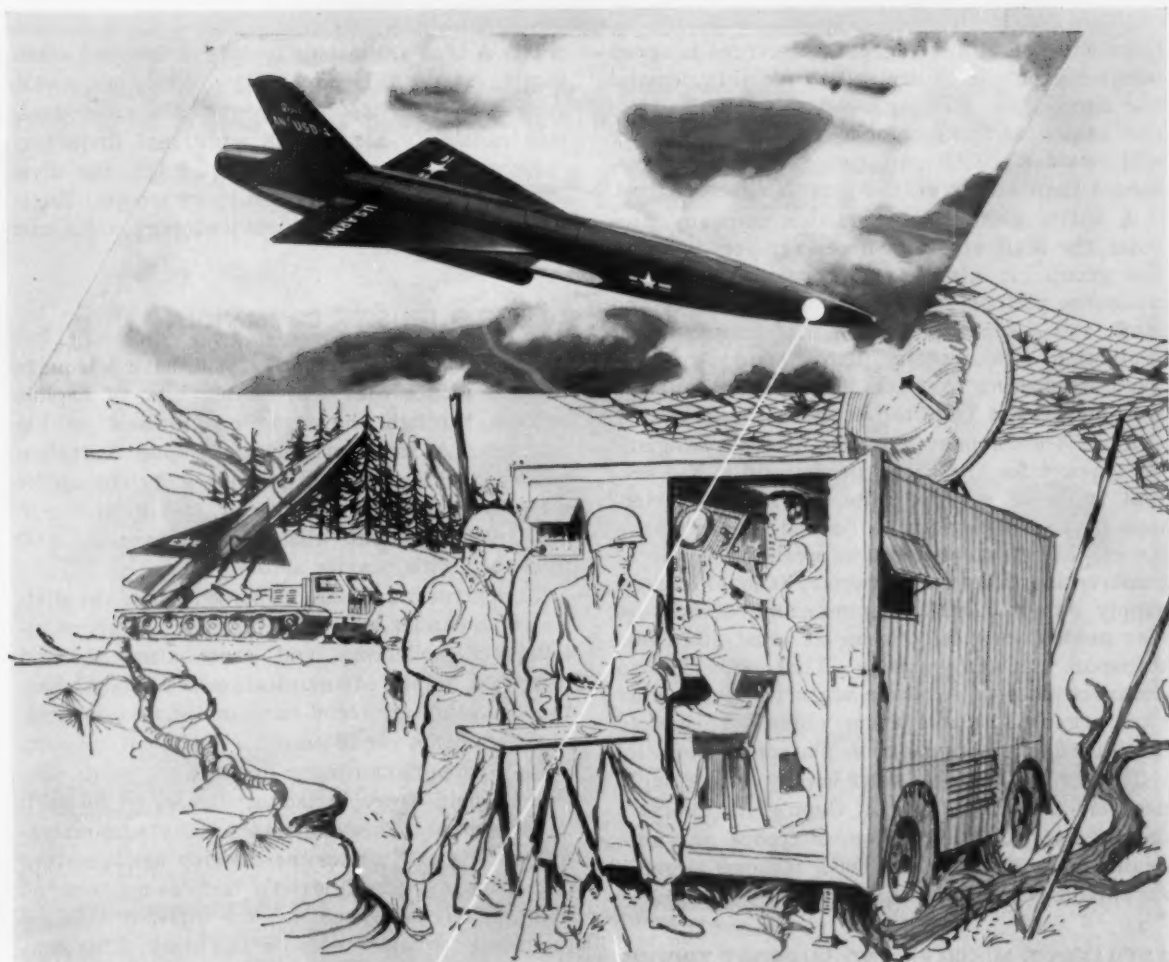
Dispersion and mass, those opposite twins of nuclear warfare, are incompatible, but both can be enjoyed only when we have the finest communications system that extends down to the smallest and most dispersed elements. During World War II we had radios and telephones in platoons. Dispersion on the future battlefield requires that the squad have adequate radio communications, as in armored infantry units now. Perhaps in the not too distant future each sol-

dier will have his own radio. This seems to be a logical progression which the Signal Corps has anticipated. Much work has been done in developing helmet radios and solar batteries.

Dispersion also entails other communications requisites, including more eyes for the commander. TV, drones, and reconnaissance aircraft can meet this requirement.

Unfortunately, increases in signal gear generate greater maintenance requirements. In addition to radio, TV, and drone platoons, the battle group's signal company must have its own maintenance platoon. It also needs a photo section to provide organic and rapid means of picture transmission.

Except for necessary headquarters and logistical units our battle group is now complete. Heavy trucks, tanks, and engineer construction equipment are purposely excluded. They are too heavy for easy transportation by aircraft that are adaptable to battlefield needs. There is no need to reinforce or demolish obstacles if a fighting unit can be flown over or around them. Engineer requirements are greatly reduced. Expensive tanks offer ready targets that can be easily destroyed by relatively inexpensive and smaller weapons now available to the foot soldier. Our organic Army aircraft must be armed and thus outfitted for a dual role. When armed they carry a powerful, mobile firepower. The cavalry tradi-



## ***SPLIT-SECOND INFORMATION***

An effective Army must have split-second, exact combat intelligence. Republic's Missile Systems Division is working on one means of fulfilling this need for the U. S. Army with the AN/USD-4 Swallow system: a completely integrated ground-airborne information-gathering system.

The SD-4 system includes an all-weather, jet-powered surveillance drone, mobile ground command and information stations, and associated ground support equipment. The drone will be field-launched and employs any of a number of surveillance sensors. This high-performance unit will permit the field army commander to extend his view beyond the horizon to gain up-to-the-minute information. Its mission completed, the SD-4 will return, be recovered and readied for a new mission.

The airborne-ground SD-4 Swallow system was designed and is being developed by Republic's Missile Systems Division under contract to the U. S. Army Signal Corps.

**REPUBLIC**  **AVIATION**

**MISSILE SYSTEMS DIVISION**

MINIFOLK, LONG ISLAND, N. Y.





tions will live. But the great differences in speed between ground mobility and air mobility demand the elimination of all ground vehicles that are not easily airtransportable. Greater efficiency will result since aircraft can cover greater distances than armor on the same amount of fuel.

A battle group's headquarters company provides the staff or staffs necessary for directing the group. It also has an organic air reconnaissance platoon for the use of commander and staff, and a security platoon for command post protection. The security platoon must have organic supporting weapons, if it is to fill any gap that may result from the extended frontages.

A service company provides necessary logistical support for the battle group, and it has several types of service units. A small quartermaster platoon establishes limited supply points. An engineer platoon must be available for light construction tasks and necessary labor details at supply dumps. Limited ammunition dumps are also needed, especially when we must store and transport nuclear weapons. That calls for an ordnance platoon. All these supporting units must have organic transportation which of necessity must be by air. An aviation platoon is essential to the service company, since supply and resupply necessarily will be by air. Supply installations require the protection of combat troops, and here again a security platoon, with its own organic supporting weapons, provides this defense.

## ARTILLERY'S MISSILES AND SUPPORT TROOPS

Honest John is ideal for increasing the fighting range of our division. When forward battle groups attack or defend on a front of 20 miles or more, Honest John can deliver the atomic punch from positions within the division's area. This weapon can be air-dropped, and can be displaced by air if a rapidly moving offensive requires a quick move. Since our concept of fires is still sound for the division, five Honest John batteries would allow the formation of battle group combat teams capable of independent missions with beefed-up fire support. These five batteries would provide constant direct support fire for fast-moving battle groups.

Division artillery would need to be heavily loaded with air-defense missiles. In addition to Redeye in the hands of troops, Hawk would also be needed against low-flying aircraft. Nike Hercules, while not exactly ideal for our divisional concept, could play a dual role until a light antimissile missile becomes available. Hercules in forward areas would assist in reducing the depth of the battlefield by offering forward area protection against high-flying, high-performance air-

craft. A true antimissile missile in forward areas would extend this capability. While we await such a missile, Hercules provides a good dual-role capability along with additional firepower.

Except for its artillery complement, the division would need very few support troops. Engineer, armor, and other heavy-support units can be eliminated.

## HELP FOR DIVISION COMMANDER

The division commander must have adequate tactical airlift that will enable him to exploit success through the rapid commitment of his reserves. A transportation helicopter battalion can meet this need and provide sufficient airlift for one battle group. However, the division will still normally fight with a small overland tail thickened with heavier artillery.

To control his widely dispersed units, the division commander will need improved means of intelligence collecting and reconnaissance, and increased signal communications. A signal battalion and an air recon company should do here.

The division needs no other logistical support. Supply support can move direct from small, dispersed, field army logistical dumps to forward battle groups. This eliminates many administrative details and allows the division headquarters to concern itself with strictly tactical matters.

It can be easily seen that the division will still require the support of corps and army. This support is divided among small logistical and tactical units dispersed over wider areas of the battlefield. They too will depend upon air mobility.

Corps and army artillery, in the form of Corporal, Sergeant, Redstone and Pershing, would increase the depth of the battlefield, enabling corps and army commanders to direct their units over extensive areas.

This proposed reorganization is not for the future. It is for now, and is based upon current technological capabilities or upon those which could, with adequate funding, be available within the very near future. A revolutionary and rapid reorganization of our Army and its tactical concepts would give us the initiative in the international game of power politics. Revolutionary and rapid changes that ignore the time-consuming processes of evolution would give us a preponderance of ground power. That would constitute a deterrent to limited wars launched by countries with masses of manpower but having little technical, productive, or economic capabilities. It would also provide us with the ability to fight major wars without resorting to all-out nuclear destruction.

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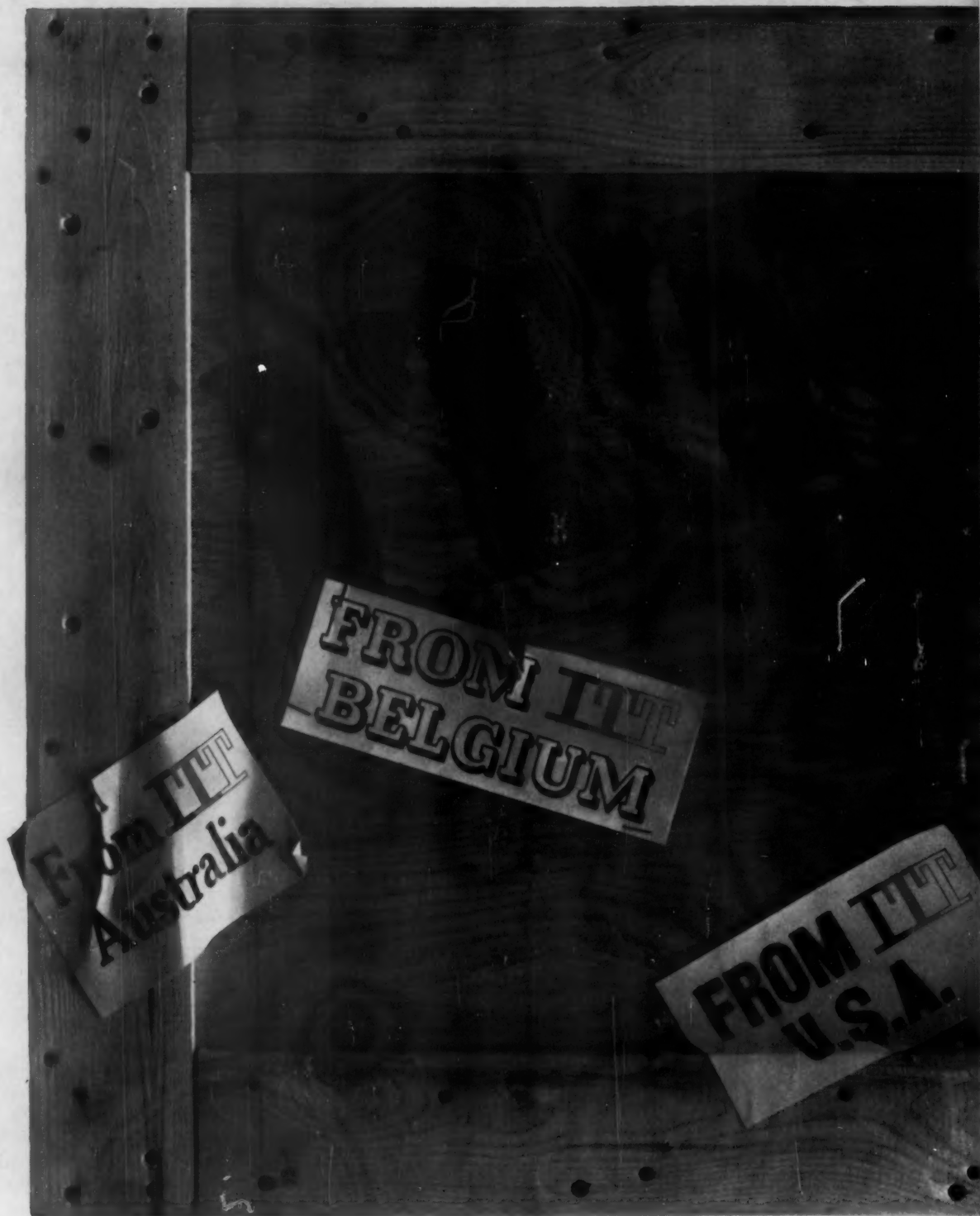
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# ARMY- cerebrations

## USE AND ABUSE OF UTM COORDINATES. *Carelessness can be dangerous*

Capt. E. H. BIRDSEYE

The proposal to use the UTM coordinate systems ["A Common Map Language for Civilian and Soldier," ARMY, April 1960] on road maps, town plans, and the like, is a fine one and certainly would solve many problems. However, it would engender new ones, an example of which Colonel Abbott innocently included in his Cerebration. The UTM coordinates he gives are incomplete: they do not locate a particular point on the earth's surface but actually fix eight different ones—four in the Northern Hemisphere, four in the Southern. To be complete, coordinates must include the Grid Zone Designation (GZD), the 100,000 Meter Square Designation, and the coordinates to the desired accuracy.

The GZD fixes an area on the earth's surface extending for 6 degrees of longitude and 8 degrees of latitude—but only if the zone number and letter are given. That is where Colonel Abbott's coordinates were in error: he failed to include the letter.

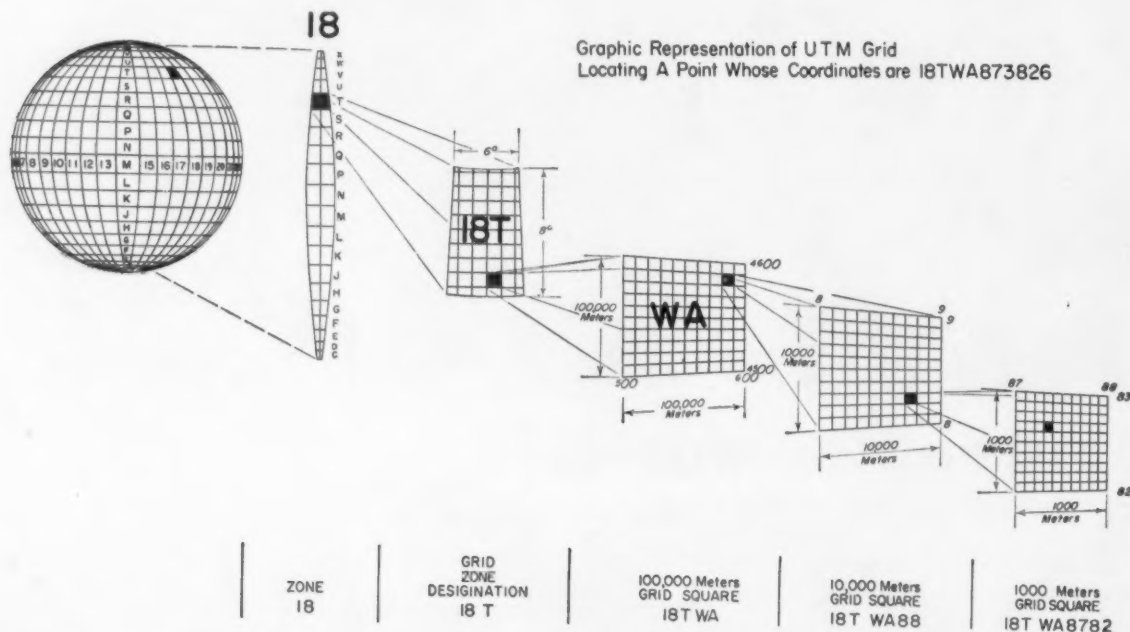
There are 60 zones, each 6 degrees wide, and each identified by a number, but they extend from 80 degrees N. to 80 degrees S. latitude. Therefore they must be further subdivided if precise and simple re-

porting is to be made possible. This is done by dividing each zone into 20 bands, each having an extent of 4 degrees latitude. Bands are identified by two letters. Thus, any particular (6 degrees by 8 degrees) section of a zone is identified by a number and a letter. Both number and letter are necessary for specific identification (see the sketch).

Each area is further divided into 100,000 meter squares that are identified by two letters. Within Grid Zone 18 are eight repetitions of the 100,000 meter square WA; but within Grid Zone 18T only one 100,000 meter square is identified as WA. Now, with these identities, 18T WA, we have located a specific 100,000 meter square on the earth's surface. Next, we will determine the coordinates of a point within this square.

Depending upon the accuracy desired, the map's scale, the correctness of the measurement, and other factors, we can locate a point within the 100,000 meter square to various accuracies:

Accuracy	Coordinates
10,000 meter	18T WA 88
1,000 meter	18T WA 8282
100 meter	18T WA 823824
10 meter	18T WA 82318243



## VERSATILE SD-2 SURVEILLANCE DRONE SYSTEM BY AEROJET

Designed for night and day battlefield surveillance, the Army's improved SD-2 Surveillance Drone System is an all-weather eye in the sky. In situations of general or limited warfare, the SD-2 provides the field commander with up-to-the-minute information on enemy activities. A product of Aerojet's Aeronautical Division at Downey, California, this versatile drone system features greatly improved performance and mission capability. Advanced flight testing is taking place at the Army's test station near Yuma, Arizona.

The current model carries the Army's latest sensory devices, including radar, infrared, photo transmission equipment, and high speed cameras. Stability in flight is excellent, making camera stabilization unnecessary and reducing system complexity and cost. Flight of the vehicle and subsequent recovery by parachute are remotely controlled, or supplemented by an on-board programmer.

*Aeronautical Division*

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## ROUND THE CLOCK SURVEILLANCE



To take the 100-meter example, the complete UTM coordinates of the house in Colonel Abbott's article would be 18S UT 178981. Incidentally, note that the easting and northing coordinates are not separated, but that the six numbers run together. Every map produced by Army Map Service has these instructions in its marginal data.

The point I make is that careless use of UTM coordinates by the inexperienced can be dangerous. We can recall costly errors in Korea by people who should have known better. Such blunders as using the wrong 100,000 meter squares identification, including an odd number in coordinates (like DB 25386 instead of DB 2586), reading coordinates incorrectly at the Grid Zone Junctions J51 and J52, using one system for the easting and another for the northing, and so on.

Can we expect Civil Defense personnel and other civilians to use the UTM grid correctly, or would the mistakes rule out any benefits? Perhaps in a specific locality the difficulties might be minimized, because in a small area the Grid Zone designations and 100,000 meter squares would not be so important. But remember that there are other factors to consider: grid zone junctions, remembering to read RIGHT UP, using numbers properly and, perhaps most important of all, the

variety of scales at which road maps are printed would require a different map plotter for each different map scale. Can you visualize the difficulties here?

If a coordinate square were available, how close can a point on a map whose scale is 1:1,000,000 (that of most commercial road maps) be fixed? A little experimentation shows you could not fix a point closer than to the nearest 1,000 meters, or about .62 mile.

An additional difficulty would arise through possible distortion, depending upon the projection, of the UTM grid system when used on a small-scale map. Transposing these coordinates onto a large-scale map might easily beget more errors.

We all know the truth of the old saying, "Practice makes perfect." Disuse of any principle, once learned, can result in a gradual inability to perform an operation. We can teach the mechanics of determining coordinates, but will the ability still be there when a crisis arises?

At least part of Colonel Abbott's suggestion has been put into practice. U. S. Geological Survey maps, now available at nominal cost, are printed with the UTM grid system included as ticks around the border. With these maps and the excellent ones produced by AMS, we have the tools, but can the users read them?

## **AN ARMY UNIVERSITY.** *A better educated, more standardized officer corps could be produced*

**Capt. JAMES C. BOWMAN**

Consolidation and streamlining of the service schools, and of the concept of officer education in the basic and advanced courses, are badly needed. I believe we should establish an Army University having two branches: a Technical University with basic and advanced courses for officers of the technical services, and an Operational University with similar courses for officers of the combat arms and of other branches.

Our current practice of maintaining a separate school for each branch is both wasteful and inefficient. By including basic and advanced courses at many schools we are duplicating much instruction. For example, the faculty of a technical service school includes officers from that service, from other technical services, and from the combat arms. The various basic and advanced courses teach many subjects which are common to all schools. These subjects could be taught by one committee if the students were brought together in one place.

There are advantages in the university system. It assembles the various technical staffs of the different services and branches at two common locations, each a branch of the Army University, and each consisting of the relevant technical and operational colleges—Signal College, Infantry College, and so on.

Economy will be effected through maintaining only two major schools for both basic and advanced students. Critical manpower will be conserved because staff and faculty needs will be fewer. Modernization will result through a more up-to-date concept of

education that permits better methods and facilities through consolidation, requiring only one university rather than several separate colleges. We will achieve simplicity through easier control by centralization.

Our branch schools will become smaller if we have a separate college for each arm or service that teaches only those subjects peculiar to that arm or service. We will need fewer teachers because we will have instructors from all arms and services in the special courses in the different colleges.

There would be a higher order of instruction and more teaching on the graduate level. There would be more opportunities for officers of different branches to learn and appreciate one another's functions and problems, through attending classes together and through social activities after school hours.

Methods of teaching could be modernized through the use of closed-circuit television for large classes, and using films of lectures in libraries for research and special projects. If we abandon schools of the arms and services, the homes of the branches will be free to take on the full responsibility for special planning, formulation of doctrine, and can function as the operational and doctrinal center of the arm or service.

Within the Operational University we should have a General College to teach subjects common to all arms and services, with specified special courses. It would have colleges of the combat arms, such as Infantry and Artillery, and each college would be divided into a basic and an advanced school, each with a dean.

The Army Technical University, for the technical



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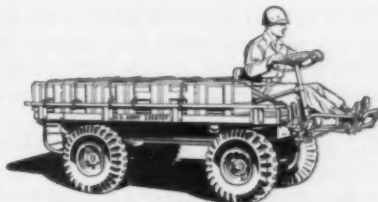
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services, would be organized similar to the Operational University.

The basic course at the Army University should be modeled on the typical college or undergraduate school; the advanced course on the model of the typical graduate school. This system will assure that the officer's education is progressive. It will show him that the Army considers him mature and responsible (rather than impose on him the regimen and psychology of the grade school, as is too often the rule now). Graduate instruction should include a maximum of seminar courses, with a minimum of rote geared to

a grade or class standing. The basic school should teach a great deal of detail, and concentrate on drilling into the student the many basic skills an officer needs to begin his career. The advanced course, on the other hand, should be geared to a mature scholar who knows why he is at school, who is assumed to possess the intelligence to apply himself, and who wants to think individually and creatively.

Though my proposal offers some drastic changes and will no doubt bring opposition from those who wrongly see in it the concept for a one-branch Army, the ultimate result should be a more homogeneous Army, and a better-trained and educated officer corps.

## GILDING THE MISSILE. *Sometimes we let our enthusiasm claim more than a new weapon can produce*

Maj. PAUL M. CROSBY

What's wrong with this statement, by a nationally known columnist in a newspaper dated 18 September 1959? "This tiny guided missile, only five feet long and seven inches in diameter, carries no atomic warhead. Its high explosive charge is the latest anti-tank threat the Army has developed, and can be fired from almost anywhere—a stand on the ground, a truck, another tank."

For one thing, it implies smallness through the use of the words "tiny" and "seven inches in diameter." Finally, it was published almost a year to the day after the Army discarded the weapon it discusses. As you may have guessed by now, that was the Dart AT guided missile. It weighed more than a hundred pounds. The span (wingtip to wingtip) was about 42 inches.

ARMY, in its issue for June 1959, quotes evidence (no doubt from an official press release) of the same kind of careless thinking. On page 53 we read: "The SS-10 antitank missile . . . can put out of action any tank known to exist. This missile can be . . . operated by one soldier. . . ." (The italicized phrases are either unproved or misleading.) No doubt the SS-10's warhead can punch a hole in a lot of static armorplate. The doubt arises when the range limitations of this missile are stated—minimum 450 yards, maximum 1,600 yards—and a live enemy tank enters the picture.

It is conceivable that one soldier can operate the SS-10 system, but he'd have to work like hell to do it. In its shipping crate this missile weighs about 104 pounds. Uncrated, missile and launcher together weigh about 48 pounds. The minimum equipment required to power, test, and fire the system adds an additional 217 pounds (not including telephones and chests). These essential elements are: a signal generator, a power supply, a gunner's control stick and binoculars, a selector box, a missile, and the cabling to connect them. A circuit tester and a missile battery tester are needed for checking the system before firing. How far can one soldier carry all this gear?

In ARMY for November 1959, the caption to the picture of the SS-11 on page 32 says that the SS-11's warhead can destroy any known tank. This is re-emphasized by Major Patrick W. Powers in his article

in the same issue. Captain Jonathan L. Holman, on page 42, isn't quite so positive, but his SS-10 and SS-11 warheads "can pierce very heavy modern armor." The last statement is true and the first has not been proved, but there is no accepted equivalence of the two.

Captain Holman includes two instances where critical weakness in the current family of antitank guided missiles are overlooked. On page 42 he says: "The [SS-10] guidance operator directs it to target visually [he simply eyeballs it in] using a lever mounted on a small control box. If observation is difficult he may use binoculars as an aid."

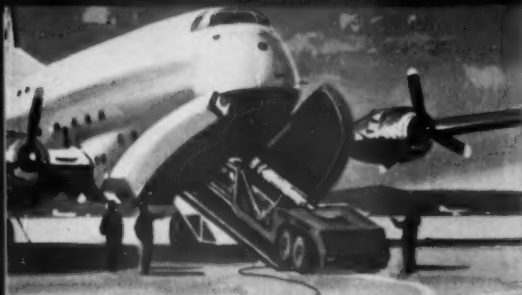
Although by most standards the guidance system used with the SS-10 and SS-11 is simple, especially if we compare the AT missile with the long-range artillery missile, tests show that the gunner must have superior eyesight and emotional stability and extraordinary eye-and-hand coordination. Furthermore his training requires four to six weeks, many hours of which are devoted to practice with simulators, before he is trusted to fire some \$11,000 worth of missiles.

The antitank missile is known to be sensitive to terrain, with the chance for success being greater where missile (at launch) and target are on opposite slopes of a valley. The SS-10 and SS-11 rotate slowly in flight. Their trajectories are helical-shaped, like a spiral spring that has been stretched beyond its limit of elasticity. To fire, the gunner must guide the missile laterally to the gunner-target line, then vertically until the flare on the missile is eclipsing the target ("eyeballing it"). His eye may be a yard or so above the ground; the center of mass of the target tank may be two yards or so above it. Consequently, the spiral trajectory nearly parallels and is only a few feet above the ground. This makes trouble for the gunner, especially if vegetation is thick. In test firings, most missiles have fallen short of the target.

There is more evidence that guiding the missile (and thus the training of the gunner) cannot be dismissed as a simple problem. After the gunner completes training, to remain proficient he needs continual retraining, by means of simulators.

The second weakness from which our attention has been diverted is the minimum range of the missile.



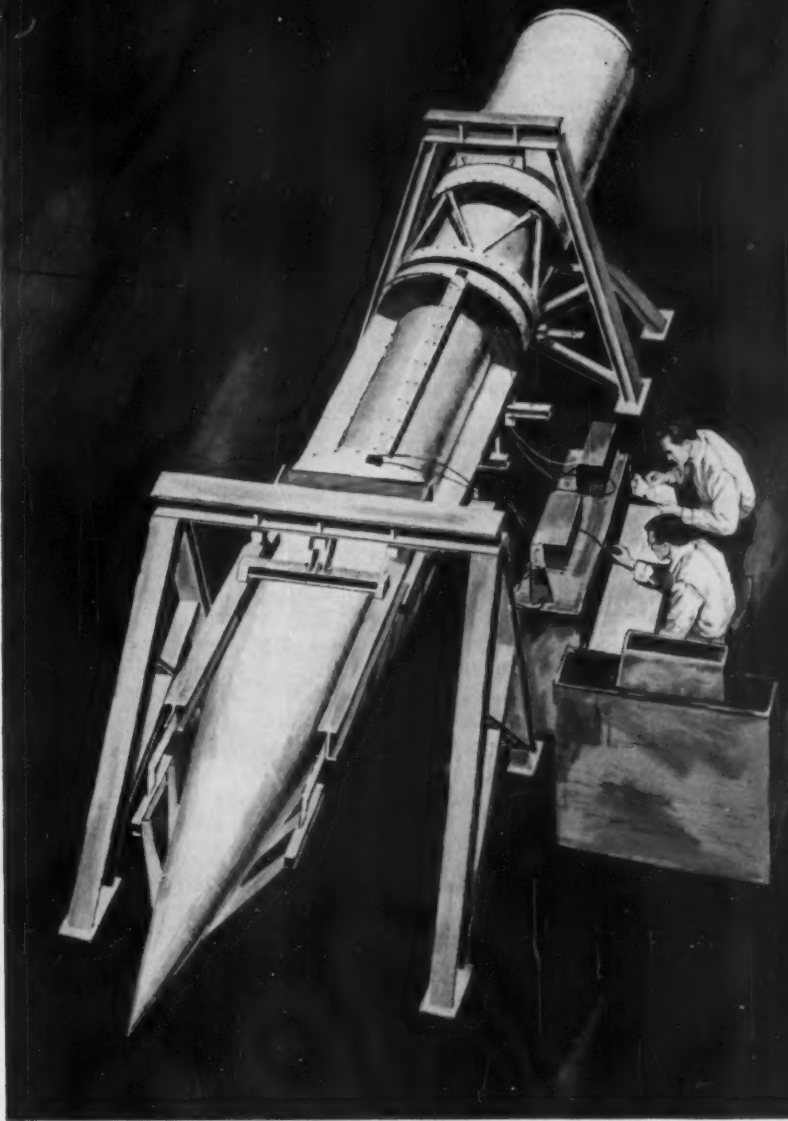


**AIR TRANSPORTABLE MISSILE.** Sergeant can be flown to battlefield area. A supersonic, medium range, ballistic guided missile, it is 30 feet long and 31 inches in diameter.



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A battlefield missile must be simple, fool-proof, reliable, tough. Sperry Utah has the assignment of insuring that the Sergeant—latest in the Army's guided missile arsenal and successor to the Corporal—will be all these and more when it becomes operational.

Sperry has assisted in the Jet Propulsion Laboratory's development of Sergeant. Sperry has the prime contract for production of the missile system together

with its launcher and its servicing-handling-maintenance equipment. First production is now under way at Salt Lake City.

The Sergeant can be transported by sea, surface or air. It will give increased fire support—both nuclear and non-nuclear—to forward deployed forces and to STRAC. In addition to its highly accurate and reliable guidance system, Sergeant incorporates "drag brakes," the latest development in range control for solid-fueled missiles. Coupled with the Thiokol power plant, the brakes aid in pinpoint battlefield aiming.

The Sergeant program is one of a number of projects going forward at Sperry Utah—projects which include classified work in advanced infrared systems among others. Here, as in every other area of our environment, Sperry is contributing significantly to America's progress in defense. Sperry Utah Engineering Laboratory, Division of Sperry Rand Corporation, Salt Lake City, Utah.

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We read (on page 42) that "the SS-11 will supplement the SS-10, not replace it, because the SS-10 has a better usable minimum range. In an AT missile, effectiveness at a very short minimum range is as important as effectiveness at maximum range." Farther on, we are told that the "Moskito is notable as one of the free world's smallest missiles. It is controllable from 50 yards out to about 1,600 yards."

Your control over the projectile ceases when you fire a gun. With the AT guided missile, you can retain control because the missile carries a guidance system and a communications link. (This is one of the most obvious advantages of such a system.) The gunner's commands are generated by some kind of control stick, and as these commands enter the missile, they regulate the guidance surfaces (spoilers, ailerons, and so on).

At missile launch, a skillful gunner will gain control quicker than will a clumsy one. The combination of gunner reaction time and launch velocity causes the minimum range feature that is characteristic in this family of missiles. For the SS-10, this minimum is about 450 yards; for the SS-11 it is approximately twice as great, because the SS-11 flies faster.

Minimum range affects the tactical value of the missile system. During river crossings, at beachheads and drop zones, where enemy tanks are present but friendly tanks are not, this feature may nullify the ATGM's tank-killing capability. The same weakness may appear during fighting in cities, among hedgerows, and on terrain having marked cross-compart-

ments, where the interval between a firing position and a target is less than the minimum missile range.

As for the minimum range of the Moskito, even the manufacturer isn't so optimistic as to claim a mere 50 yards; 10 times 50 would be more accurate. Surprisingly, because of its small size and limited capabilities, the Swiss have been unable to sell the Moskito in quantity abroad. Yet, according to Captain Holman's article, its minimum range is far superior to that of the SS-10, its lethality and maximum range are the same, and it is smaller.

To sum up, it is harmful to stress the favorable aspects of any system and to ignore or minimize its weaknesses. Often, the hopes or wishes of the designers are confused with actual performance. This is a pleasant form of self-deception, but it can be dangerous. The unspecialized reader (as most of us are when any *one* subject is considered) is led to believe we have solved a particular problem when we haven't. He is encouraged to think only of the favorable side of things. Any apprehension he may have about our ability to defeat the Soviet armor is allayed by such words or phrases as "it can kill tanks," "light-weight," "simple," "small" and "can be carried, set up, and fired by one man."

Let's have the courage to be forthright and to face things realistically. If our current system of antitank weapons is as good as some would have us believe, we can save a lot of money by terminating a number of projects. If it isn't, let's stop kidding ourselves.

## **SOLDIER, TREAT YOURSELF.** *On tomorrow's battlefield the combat soldier will sometimes have to be his own medic*

**Maj. JOHN P. TYLER, III**

"Sir, that enemy low air burst caught one platoon of Bravo Company. About 30 men are casualties or soon will be from radiation effects; we have another 15 in a radiation hot spot who can't be moved or get out of their shelters until the area cools off. Those 15 will have to take care of themselves, but the 30 must be treated right away or be evacuated quickly."

"Sorry, Bravo. You're six miles from the battle group aid station, and that's swamped now. Division reports they're loaded and the helicopter company is grounded by some kind of persistent nerve gas. Do your best. We'll send help when we can."

Can it happen? The tactics suggested or demanded by today's improved firepower, mobility, and battlefield surveillance indicate that it *can* happen—on tomorrow's battlefield. Small units attacking or defending in widely dispersed directions and formations bring nightmares to tacticians. But think of the headaches the logisticians will have! How can these units be resupplied and supported with the multitude of administrative functions of today's field army?

One of the greatest difficulties is that of medical aid and treatment. The mere threat of nuclear or chemical attack requires dispersed formations. Our current concept of centralized medical collecting stations where casualties can be brought offers the best answer if the collecting stations are not targets; if our means

of transportation are not interdicted by enemy ground and air action; if the collecting stations are not overburdened; and if teams of doctors and aidmen are available and can be dispatched to mass casualty areas or to overloaded stations.

Thus, soldiers will have to be trained to render self and mutual aid in combat. This requires that the scope of first aid training be broadened. Not too many years ago, blood plasma had to be administered by a doctor at a hospital. Aidmen were taught to do this during World War II. They had the know-how and the equipment. Herein lies our problem. We must increase the individual soldier's know-how and personal equipment.

Each soldier must learn to diagnose and treat. First aid will have to encompass much more than checking blood and splinting broken bones. Each soldier on the battlefield will have to be as well trained as our medics are now. One wonders about this future combat soldier who will have to be highly trained and savvy enough to operate and maintain his sophisticated weapons, electronic communications, monitoring devices, and besides know how to take care of himself. Some of our training methods may have to be changed, and more hours will have to be devoted to first aid.

Training is half the solution; the other half is equipment. Individual soldiers and small units must have with them certain diagnostic tools such as



## TIROS GROUND STATIONS...

### Nerve Centers For A Satellite

Over 25,000 informative cloud-cover pictures have been received from TIROS I since it was launched on April 1. In two months the satellite had completed 1000 orbits and travelled 27,500,000 statute miles. This means not only that TIROS itself has performed as planned, but that the complex problems of command and control, as well as signal reception and processing, have been successfully surmounted. Like the satellite, the special ground station equipments were designed and built by RCA Astro-Electronics Division under the auspices of NASA and technical direction of the U.S. Army Signal Corps.

Major components at each of the four ground stations include:

- Five TV receivers and four beacon receivers used in diversity reception to minimize signal fading
- A programmer which pre-programs different combinations of operating modes, and a 200 watt command transmitter
- A TV monitor to display the picture signal for the automatic recording camera. The camera is equipped to make either positive or negative films
- An indexer and sun angle computer which generate an index number and sun angle indication for each picture, used for geographical orientation
- An attitude recorder which picks up the earth-horizon signal for spin axis position computation

- Two standard 4-channel tape recorders to back up the monitor
- Two paper recorders to monitor forty telemetered satellite parameters
- An antenna programmer which directs the antenna to follow the orbit of the satellite when it is in range of the ground stations

All program functions are timed by a master clock which is synched to standard time signals from WWV. In addition to normal picture direct transmission and record functions, the programmer can also command spin-up. After two months the spin rate had decreased to 9.4 rpm's due to the effect of the earth's magnetic field. On command from the ground, two solid propellant spin-up rockets on the satellite were fired, increasing the spin to 12.8 rpm's.

AED's own ground station was used to process photos from the magnetic tapes for the first one hundred orbits.

The integrated design and development of these TIROS ground stations is an indication of AED's capability in *total satellite systems*. This capability will become increasingly critical as more and more complex satellites and space probes are launched to advance man's understanding and control of his universe. To discover how you can draw on this broad R & D experience, contact the Marketing Manager, RCA Astro-Electronics Division, Princeton, N. J.



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thermometers, dosimeters, and similar instruments. They must have many more articles in greater numbers. Before I tread harder on our good doctors' toes and have them rise en masse, let me assure the medicos that I propose a substantial increase in diagnostic and treatment abilities. Just how much and what equipment will be needed will have to be dictated by the medical profession. Possibilities for the equipment of individual soldiers and small units include: antibiotics, antihistaminics, coagulants, unguents, analgesics, antiradiation effects chemicals,

anti-shock medicines, plasma, salt solutions, needles, gut, syringes, anti-nerve gas medications, and so on.

In summary, I predict that the scope of first aid will expand. The troop leader and his men must be capable of self and mutual first aid to include treatment within the skill of the individual soldier and limited only by the availability of equipment. We must broaden this know-how and augment the equipment to implement this capability. The troop leader must be able to say, "Okay, Colonel; we'll take care of ourselves until you can get help to us."

## **DISCIPLINE AND THE FREQUENT OFFENDER.** *Proper and just punishment is one of the unit commander's most perplexing problems*

Lt. Col. RALPH B. VOTE, JR.

"Morning, Sergeant. Funny thing, I was just on my way over when I ran into your runner saying the First Sergeant wants to see me. I know what you want to see me about. As I said, I was coming over to tell you about a little trouble that happened last night.

"You know, Sergeant, my squad leader, my platoon leader, and the men in the outfit know I am an honest, hard-working soldier that wouldn't cause trouble to no one. Why these things have to happen to me I'll never know.

"I got a pass from you from 1700 to 2400 yesterday. You inspected me yourself, and you will have to admit that I was a mighty fine-looking soldier. Any of the men in the outfit will tell you I really turn myself out neat.

"As I was saying, you yourself gave me the pass. So I go to town to get myself a steak. I've been meaning to tell you the slum those mess boys turn out ain't the best I ever ate. Personally, I'd jack them up a bit.

"Anyway, I bum around town for a while, get me a steak, and on my way to the USO I pass this joint called the Gloria. I'm a bit thirsty, so I says to myself why not have a beer? I go in and politely sit myself at the bar and order a beer. This is about 2100. So I sit at the bar and sip my beer and go through my mind the Code of Conduct which I had been lectured at by my platoon sergeant that very afternoon.

"So who should walk in but two college squares and they seat themselves at the bar. As you know, Sergeant, I may have my faults, but I am polite. So I ups and says to them 'Good evening, gents!' Know what they said to me? They growled something I didn't get. But I remember that lecture by our company commander on how a soldier should conduct himself on pass, so I let it go whatever they said to me. But I am frankly telling you, Sergeant, it made me a little sore. But I says to myself, let bygones go by. So I sit there sipping my beer and thinking what a good outfit I'm in, when one of these wise guys ups and makes a terrible remark about the outfit I am in and about my branch of service. No, I don't rightly offhand recall *what* they said, but I can sure tell you it was awful.

"Well, it's quite plain to me by now that they want

a fight, so remembering what the company commander had told us about conduct, I gets off my stool and starts for the door, not wanting any trouble. I even leave a little of my beer. Well, sir, one of these gyrenes gets off his stool and shoves me. I hit the floor like a ton of rock, and next thing I know I am at the MP station with two great big MPs telling a sergeant I was drunk and creating a disturbance.

"Ain't that a laugh! Sergeant, you know I never get in trouble, and as far as drinking—well, that's true, but it was several months ago.

"Anyway, what I came to see you about is that I want to make an official complaint against either those two MPs or those two squares or whoever it was that bloodied me up. You can see for yourself, Sergeant, I ain't feeling too well this morning from the terrible beating I got last night, and I don't think it's right for as good a soldier as me to be treated—

"You say the company commander wants me? OK, Sergeant, be seeing you!"

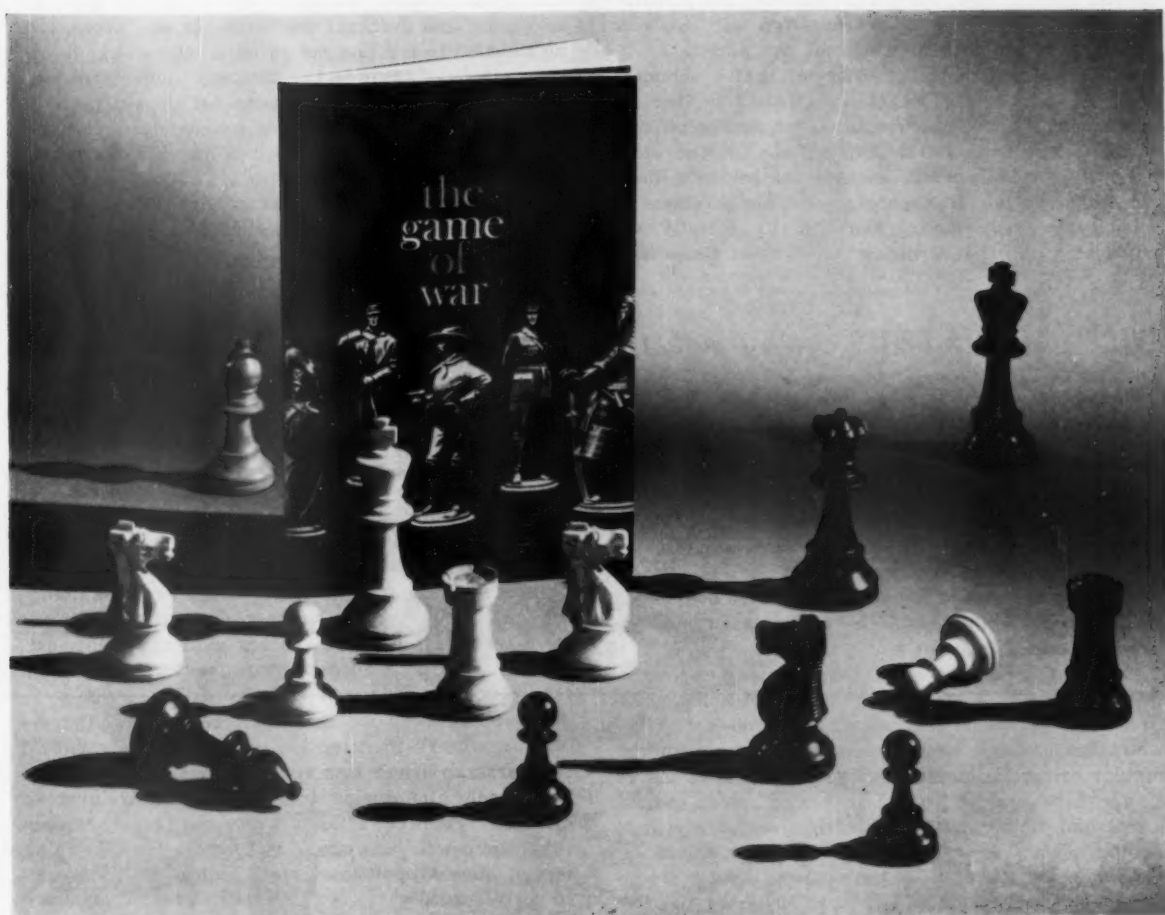
Here is an extract from paragraph 13 of a certain DD Form 581 (Offense and Incident Report):

"Received call at 0015 to pick up a soldier at Gloria Bar. Soldier was on floor passed out. Max, the owner, stated the following happened: Soldier showed up at 2345. Was served a bottle of beer, appeared to have been drinking, but was behaving. Two customers came in and this seemed to infuriate him. He became belligerent, started yelling, and when he tried to get off his stool, he fell to the floor and passed out. According to witnesses he hit his head in the fall. Check out at medics, no injury to subject."

What can you do with this soldier?

This particular offense is not unusual, and this incident shows the rationalizing that many soldiers use for logical thinking. This soldier is shrewd, but he isn't fooling his first sergeant. The problem is, how much or how little punishment shall we give him to straighten him out? Apparently this is not his first offense, and he has all the appearance of what used to be called a "thirty-day soldier"—one who periodically has to drink himself into insensibility.

What's the solution? There can be none that is based on a predetermined analysis of the offense, with a degree of punishment that will work in all cases. Each soldier, when he stands before his unit commander, must be appraised by his commander to determine his age, education, length of service, and



## rattling good history

"War," wrote Thomas Hardy, "*makes rattling good history; but Peace is poor reading.*" Scientists at *tech/ops*, taking a pioneering part in the ancient and honorable tradition of war gaming that stretches from the first chess of 3,000 years ago to modern stochastic models, are writing rattling good history in both fields, war and peace.

*Synthetic history*, they call it: the application of advanced mathematical thought, and the digital computer simulation of war or in support of map battles, which have brought *tech/ops* to the frontiers of new developments in gaming, for Army, Navy, Air Force, OCDM and ARPA, as well as business and industrial sponsors.

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civilian background; his gregariousness, his performance of duty, his marital status. And last but not most important, his potential worth to the Army.

In this case it might be sufficient that a summary court hit him in the pocketbook, with a further admonition that more courts-martial for similar offenses might be grounds for a 208 action. On the other hand, a talk could point out that the soldier's illogical thinking, his drunkenness, and his attempts at self-pity, are only hurting him mentally, morally, and physically, and that if he continues to so abuse him-

self in this manner the result will bring him more unhappiness and eventual discharge. In any event, it is no solution to tell him not to let it happen again, and then enter the affair on the company punishment book as "severely reprimanded under Article 15."

Of all the problems the unit commander faces, that of proper and just punishment is one of his greatest. There is no schoolbook solution. The unit commander's judgment and personal knowledge of his men and a true appreciation of the seriousness of the offense must guide him to the ultimate solution.

## EVERY SOLDIER A DRIVER. *Why not teach all soldiers to drive during basic individual training?*

Capt. J. R. BRINKERHOFF

The Army travels on wheels, is supplied by wheeled vehicles, and will fight on wheels and tracks. Every outfit, including the rifle company, has organic vehicles. Most tactical units are completely motorized, and those that do not have enough trucks are moved by transportation outfits. The truck has become as common and as basic as the rifle.

Every soldier should be skilled at driving and maintaining a truck, under the supervision of noncommissioned officers. Most trucks carry an assistant driver who substitutes on long trips or is a back-up for the regular driver. In order to move quick and to insure an adequate force of trained drivers to absorb combat losses and turnover, the wisest course for a mobile Pentomic army is to make *every* soldier a driver.

I know that because of physical or mental limitations not everyone is qualified to drive or to take care of a truck. That's why we have tests to eliminate the unfit. Generally these tests are administered within battle groups, battalions and companies. Thus the important function of selecting those who are fit depends on a decentralized and inefficient system.

The testing process in each small tactical unit—or even when done on a post-wide basis—varies with local ground rules and the availability of proper equipment. Also, the added burden of testing in tactical units wastes valuable training time. Form DA 348 is supposed to be executed after a soldier is tested and qualifies, and should accompany him from unit to unit. That is not always done, and so many soldiers are retested when they join a new unit.

It is difficult and time-consuming to train a soldier to become a qualified military driver. If every soldier is to be a vehicle operator, then driver training must include an effective and thorough course in first-echelon maintenance and rules of the road. Driver training in units is even more inefficient than the testing of men to qualify for instruction. Methods and results vary. Some outfits have well-organized and effective courses. Some intersperse driver training, essentially an individual subject, into an already crowded training schedule. Many outfits merely send a soldier into the cab and expect him to teach himself. Driver training must be supervised.

Almost every recruit brings with him a civilian op-

erator's license. Many are allowed to drive a military vehicle as if it were the family car. There is a great difference between driving a civilian car or truck and operating a military vehicle. The Army driver must maintain his truck in a convoy; there he must drive under discipline; he must know and practice safety measures; and sometimes he must undertake a journey under weather conditions and over terrain that he wouldn't attempt with the family car. So even if he is a good operator, we must still train the recruit to become a military driver.

I propose that we test each recruit—at the reception center—to determine whether he is qualified to undertake driver instruction. If we find him qualified, teach him during basic individual training to drive and maintain at least a 2½-ton truck. Anyone who can handle this standard vehicle can switch to lighter ones with little or no difficulty. Training men to drive larger trucks, special-purpose and even armored vehicles, would be made easier through the benefit of this basic instruction. Preventive maintenance standards would benefit from the effective and standardized course each soldier would undergo during basic training.

The outfit that eventually gets the BIT graduate would be better served if testing were done during basic training. We could enter driving qualification or unfitness on the soldier's Form 20, thus eliminating Form 348. Each driver's physical, mental and mechanical aptitude could be checked periodically, something we don't do now. Such checks would promote safety by eliminating drivers who are no longer qualified.

I realize that what I propose would add to the load of training center people. However, tests to determine qualification or unfitness for driving could be worked into aptitude tests and physical examinations. Driver training could be handled by a team of instructors with pools of 2½-ton trucks. The period of the BIT course would have to be lengthened by only about a week. However, the savings in time and money could be passed on to tactical units, where the soldier is trained to fight.

We teach the recruit to shoot during basic training, so why not teach him to drive a truck during the same period? Driver qualification should be part of basic training.





## RELIABILITY...

every missile must count. A wasted firing due to a minor-part malfunction results in appalling losses in time and money. Combat condition failures are even more disastrous. Vitro Laboratories, under contract with the U.S. Navy Bureau of Ships, has developed advanced mathematical approaches to make reliability a predictable feature of design. Over a thirty month testing period predicted failures correlated strikingly with actual results. Tested equipment included radars, radar repeaters, radio transmitters and receivers, and radio terminal equipment. Reliability is another reason why Vitro is a leading name in systems engineering today.

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# ARMY

## irons in the fire

### Bringing Back Nose Cones

Goodyear Aircraft has developed coated-fabric balloons which inflate in one-tenth of a second and will be used to aid in high-altitude recovery of space vehicles. The balloons, nine feet in diameter, will be used to retard tumbling and to control speed of instrumented nose cones, manned escape capsules, and other orbital vehicles during re-entry through the heat barrier of the upper atmosphere. A parachute is ejected at lower altitudes to complete the recovery. Called "Ballute" by Goodyear engineers, the system will be tested this summer on specially modified test missiles. One shot will seek a velocity of Mach 2 at 150,000 feet, the second a velocity of Mach 3 at 200,000 feet. During recent wind tunnel tests of 25 per cent scale models, balloons reached altitudes of 155,000 feet and speeds approaching

Mach 3. Tests simulated actual ejection, inflation, and deployment of the drag balloon configuration under high-speed flow conditions.

### New Radar for Troops

An experimental portable radar system, designated AN/TPD-2, developed to enable combat troops to look far behind enemy lines and provide photographic plots of battle information, has been delivered to the Signal Corps. Developed by Strand Engineering of Ann Arbor, Mich., the new system will sweep enemy-held territory in a 25-mile semicircle and by periodic photo plots help determine whether enemy buildup, attack, or withdrawal is in progress. The radar system is transported by helicopter to a point overlooking enemy terrain. There, a three-man crew sets up the three-piece antenna and assembles the equipment.



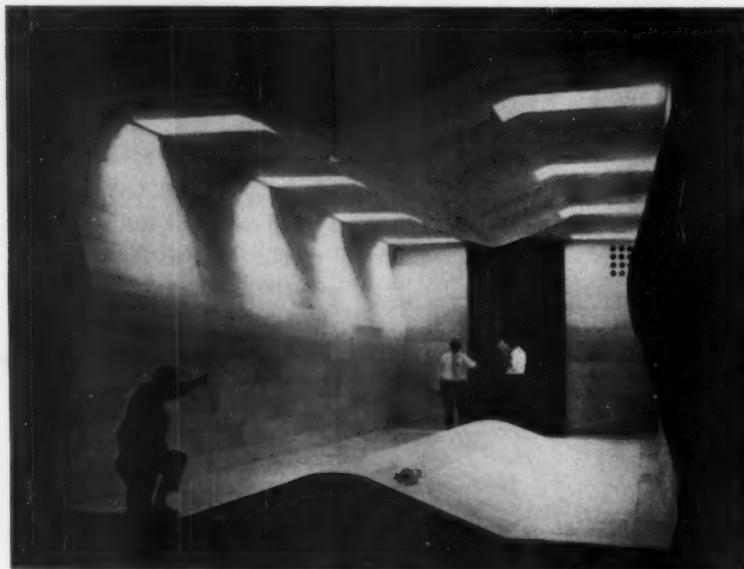
Artist's conception of what a torpedo-carrying Kaman drone helicopter might look like.

### Drone Helicopter Shown

An unmanned radio-controlled helicopter carrying two dummy torpedoes, was developed by Kaman Aircraft for use in antisubmarine operations. Being unmanned, more than 400 pounds are added to the carrying capability of the helicopter. Kaman has demonstrated in previous trials that the helicopter can be flown by a controller who follows it on radar. The HTK drone has been flown in this manner to the effective distance of current submarine detection equipment. The latest type nuclear-powered submarines often can outrun surface ships, but they do not have the speed to escape a helicopter. In addition to its weapons, the Kaman drone could carry detection equipment to locate submarines, test degree of radioactive contamination, and send back visual evidence of damage via television camera.

### Two Lanes for T6

Army engineers at Fort Belvoir are currently testing a conversion set which will permit the widening of the T6 tactical support aluminum bridge from one to two lanes. The set is designed to meet Army requirements for a two-lane tactical support bridge. The conversion set is comprised of newly designed half-floor beams and other parts which will permit the 60-ton capacity T6 to take loads up to 100 tons. Erection time for the wider bridge is only slightly more than for the single-lane construction. The T6 is a lightweight tactical support bridge for division loads. Constructed of high-strength aluminum, it can be erected faster than any other bridge of similar capacity on spans ranging from 90 to 240 feet.



This strangely shaped chamber is an anti-echo room now being used by engineers at Republic Aviation to investigate antenna performance in advanced aircraft and space vehicles without external interference from radio waves. The walls are lined with special radio-wave-absorbing materials and the bulges minimize any reflections. Radio signals will be beamed at scale models of aircraft, space vehicles, and antennas while they are remotely rotated. An antenna-pattern-measuring system, operating in the 200-to-50,000-megacycle range, will record results.



# AT WORK WITH THE ARMY



Fairchild Engine and Airplane Corporation has a long record of association with the U. S. Army. Among present Army projects at Fairchild is the AN/USD-5 long range surveillance drone system for which Fairchild has the prime contract. The SD-5 drone airframe and ground support elements are being built by Fairchild's Aircraft and Missiles Division. This drone has already demonstrated satisfactory flights in the extensive flight test program conducted by the Aircraft and Missiles Division. Other projects in which the Division has cooperated with the Army are outstanding VTOL/STOL aircraft and high flotation landing gear.

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# ARMY

## books

### PASSING OF THE OLD?

THE PROFESSIONAL SOLDIER: A Social and Political Portrait. By Morris Janowitz. The Free Press. 464 Pages; Index; \$6.75.

THE SOLDIER IN OUR TIME: By Col. G. M. C. Sprung. Dorrance & Company. 167 Pages; \$2.50.

#### Reviewed by

LT.COL. LOUIS MORTON, formerly a civilian historian in OCMH who now teaches military history at Dartmouth College.

When General Lemnitzer was named Army Chief of Staff to succeed Maxwell Taylor a little more than a year ago, William S. White, in *Harper's*, noted that his appointment symbolized the end of an era. In reminiscent tones he wrote about the passing of the Old Army. The days when war was essentially personal and was fought by men who drilled, marched, ate and suffered together, and who later looked back on their experiences with a touch of nostalgia. In those days, said White, the officers who rose to the top were leaders of men, and the retirement of General Taylor, last of the long line of heroic captains who had led the Old Army, marked the end of the breed. Lemnitzer's appointment, he declared, signified the rise of a new kind of commander, whose skills lay not in leading men to glorious deeds but in managing the vast complex required by modern warfare and in coping with the politico-military problems of the nuclear age.

*The Professional Soldier* is, in part, an elaboration and carefully detailed exposition of Mr. White's premature epitaph for the Old Army. Dr. Janowitz, a professor of sociology at the University of Michigan, views the recent history of the armed forces essentially as a struggle between the heroic leader and the military manager. The first he characterizes as the embodiment of traditionalism and glory, the second as the professional in the scientific and rational conduct of war. There is a third type, the military

technologist, and it is Janowitz's contention that the needs of the military establishment are best served when the roles of the three are in balance.

The emergence of the military manager is a consequence of the organizational and technological revolution that accompanied the rise of modern total war. The concepts, traditions, and doctrines that had sufficed in an earlier age proved no longer applicable, and Janowitz traces the changes in warfare since the turn of the century as well as organizational adjustments made to meet these changes. At every step along the way, starting with the establishment of the General Staff in 1903, the importance of the military manager was enhanced. The technological revolution that began in the closing days of World War II created the conditions that finally led to the dominance of the manager type in the military establishment. But the heroic tradition is by no means dead. As a matter of fact, Janowitz asserts, it is essential to keep it alive, for it is from this tradition that the military derives many of the ideals and concepts that make it so valuable an instrument in the service of the nation.

Janowitz's book is more than a sociological study; it is the biography of a profession in its organizational setting. In tracing developments in the military establishment over the last fifty years, Professor Janowitz has given us the first full-length, multi-dimensional social and political study of the military profession in the United States—its social, ethnic and religious origins, its style of life, its internal conflicts and tensions, its hierarchies and career patterns, its relations to other social and political institutions, its ideology, and its political beliefs and techniques. The result is a self-portrait that officers will find fascinating and even instructive. The

image reflects a group drawn largely from native Anglo-Saxon stock, predominantly Protestant, and of rural, upper-middle class background with strong regional ties to the South. It is politically conservative in outlook, but attaches less value to the profit motive and has fewer inhibitions toward government control than the civilian conservative. In doctrine it is deeply divided into two opposing groups, the absolutists and pragmatists: one believing that the objectives of war are to be gained only by victory; the other, that force must be adapted to the political objectives sought. The former Janowitz identifies with total war, massive retaliation, big bombers, a counterforce strategy, an orientation toward Asia; the latter with limited war, graduated deterrence, a finite strategy, and an orientation toward Europe.

Professor Janowitz believes the military profession is in a period of crisis and must resolve a number of difficult problems about itself before it can face the future with confidence. How should it organize itself to meet the demands of rapid technological change and of new weapons systems? What strategies and doctrines are best suited to the requirements of a period in which it must stand ready to engage in a spectrum of military actions ranging from small, brush-fire wars to limited nuclear conflict and possibly the ultimate devastation of a thermonuclear exchange? What adjustments need be made in the military establishment to carry out these missions as well as to participate more effectively on all levels of government in formulating policies involving the use or threatened use of force? What concepts, ideologies, organizational patterns, and personnel policies are appropriate in the light of the new skills required and the broadened social composition of the officer corps?

The future of the military profession, Janowitz believes, depends on its ability to adjust to technological change, to find a new set of self-conceptions, and to redefine its professional requirements. These can best be achieved, he thinks, if the military is willing to transform itself into a constabulary force. Such a force, unlike the present military establishment, does not

operate on the outmoded distinctions between war and peace, but like a police force is always ready for action. And like the police, it is dedicated to a minimum use of force policy rather than the total destruction of the enemy. Further, since the constabulary is pragmatic in outlook, it would view international problems rationally and avoid confusion that arises from equating strategy with one type of weapon and tactics with another. "The constabulary force concept," says Janowitz, "encompasses the entire range of military power and organization," from the weapons of mass destruction to those of paramilitary operations and guerrilla warfare. Civil-military relations would present few problems since the officers of a constabulary would share civilian values and would therefore be "sensitive to the political and social impact of the military establishment on international security affairs."

This solution to the problems of the proper organization and doctrine for the U. S. military establishment is not likely to persuade the military. And it leaves unanswered many questions that the author himself has raised. But like most of what Janowitz writes, it has elements of merit and certainly deserves consideration. Many will disagree with Janowitz's fondness for setting up categories and for generalizations, sometimes with inadequate data. But he has written a stimulating and at times a brilliant book. In the next revision of the Chief of Staff's recommended reading list, *The Professional Soldier* certainly will take its rightful place near the top of the list with works like Huntington's *The Soldier and the State*, and Masland and Radway's *Soldiers and Scholars*.

*The Soldier in our Time* is as different from Janowitz's book as one could imagine. It is not a scholarly work, though its author, a Canadian infantry officer, is a Ph.D., and it lays no claim to definitiveness. It is discursive rather than expository, and is appropriately subtitled "an essay." Nevertheless it deals with the same problem: How Western society is to meet the threat that challenges its very existence. Unlike Janowitz, Colonel Sprung finds the answer in the ethos of the soldier and suggests that so-

## Selected Check List of the Month's Books

*This is a run-down of some of the books we have recently received.*

**THE BATTLE OF GETTYSBURG: A GUIDED TOUR.** Lt. Gen. E. J. Stackpole & Col. W. S. Nye. The Stackpole Company. 96 Pages; Illustrated; Maps; \$1.00. Highly useful guide to a tour of the battlefield, with guide posts set about the area and present-day roads indicated. Thoroughly dependable.

**THE BRITISH FOOT GUARDS.** L. C. Silverthorne & W. D. Gaskin. Hope Farm Press. 72 Pages; \$3.00. Sound bibliography that lists 217 titles, with descriptions, relating to all aspects of the five regiments of Foot Guards: Grenadier Guards, the Coldstreams, the Scots, the Irish and the Welsh Guards.

**COMBAT LEADER'S FIELD NOTEBOOK.** The Stackpole Company. 123 Pages; Illustrated; \$2.00. This pocket-size book is brought up to date on attack and defense, bivouacs and camps, CBR, camouflage, Code of Conduct, field fortifications, first aid, FO procedure, symbols, patrols, weapons, communications, and other subjects.

**THE MEXICAN WAR.** Otis A. Singletary. University of Chicago Press. 181 Pages; Illustrated; Maps; Index; \$3.75. Military operations are included in four chapters. The other three deal with generals and politics, interservice disputes, and diplomacy.

**MILITARY HISTORY OF THE CIVIL WAR.** W. Birkbeck Wood & Brig. Gen. Sir James E. Edmonds. G. P. Putnam's Sons. 328 Pages; Maps; Index; \$1.35. Reissue of *The Civil War in the United States*, published some 30 years ago. A solid work, it begins with winter of 1863-64, with Grant facing Lee, and discusses all other campaigns.

**PSYCHOLOGICAL WARFARE.** Lt. Col. Paul M. A. Linebarger. Duell, Sloan & Pearce. 318 Pages; Illustrated; Index; \$6.00. New printing of the second edition, which includes paywar in Korea. Indispensable for the soldier and serious student, interesting to the layman.

**THE SINAI CAMPAIGN.** Maj. Edgar O'Ballance. Frederick A. Praeger. 223 Pages; Maps; Index; \$5.00. Objective military analysis of the 100-hour war between Egypt and Israel, by a British officer. Somewhat in the form of an enlarged and extended war diary.

**UNITED STATES ARMY IN WORLD WAR II.** Chronology, 1941-1945. Compiled by Mary H. Williams. Office of Chief of Military History. 660 Pages; Index; \$4.75. A day-to-day running account covering combat on land and sea and in the air, by all participants, as well as important political events. Complete lists of abbreviations and all code names used. Index of some 19,000 lines includes persons, places, units, theaters and commands, campaigns and battles, of all forces.

ciety must adopt some of the values and ideals of the military, rather than the reverse, if it is to survive.

The military way of life, Colonel Sprung argues, is based on a doctrine of survival. Born in battle, this doctrine is the cement that binds together an army, that gives it its purpose and shapes its traditions and customs. The wisdom of the soldier, therefore, has a relevance in periods of crisis, when survival itself may be at stake, that we cannot afford to ignore.

Colonel Sprung does not conclude from these premises—and few will deny their truth—that society should organize itself along military lines. That path, he knows,

would lead to militarism and loss of the values we seek to preserve. Nor does he deny that there are contradictions between military organization, with its emphasis on authority and obedience, and a free society based on recognition of the rights of the individual and the rule of law. But he maintains that the soldier's way of life represents "an accretion of wisdom from the survival struggles of earlier times," "a touchstone to detect the presence of survival vitality in a people." It is this touchstone, Colonel Sprung believes, that points the way to a clear and firm purpose of what we must do to meet the challenge of the future.

## COMPLEX THEATER OF WAR

UNITED STATES ARMY IN WORLD WAR II: Time Runs Out in CBI. Charles F. Romanus and Riley Sunderland. Office of Chief of Military History. 428 Pages; Illustrated; Maps; Index; \$6.75.

### Reviewed by

COL. ROBERT B. RIGG, Assistant Military Attaché to China from 1945 to 1948, and author of *Red China's Fighting Hordes*.

A proving ground pockmarked with political pitfalls, the Orient has offered rough challenges to Western leadership. China itself has been a potential graveyard for the reputation of every Western soldier or diplomat who has tried to make sense and order out of its chaos. CBI was a complex theater of war because among other things it represented a collision of cultures. Western soldiers can learn much of future value from a study of such experiences and factors as are revealed in this well-documented book which is alive with the myriad problems that collided head-on against the officers of this split theater. The Japanese enemy provided only a portion of the obstacles which Lt. Gen. Albert C. Wedemeyer and all others in CBI had to contend with.

This revealing text is as modern and as applicable as any volume on present-day weapons because it points up many of the human-relations and military problems that today and tomorrow face our missions and MAAGs in our effort to strengthen the free nations of Asia. For example, the core of the book concerns General Wedemeyer's attempt to provide the Chinese with an army they could support and one powerful enough to guarantee China's freedom.

The authors also cover the last military campaigns in Burma and China, the epic of the \$148 million Ledo Road, the Fourteenth Air Force against the Japanese, the Mars Task Force, SOS and logistics, and the role of the India-Burma base. Soldier readers will find it profitable to look back on CBI's logistical problems and obstacles, and the manner in which they were largely overcome.

Some of the little-known facts regarding Allied military intelligence are revealed in this history. There were so many intelligence agencies at work in this theater that in January 1945 Wedemeyer warned Ambassador Hurley that the situation was confused and potentially dangerous. Additionally, British intelligence activities in

China caused the Americans concern, and the Orientals even sold the same information twice to different U. S. agencies.

This history adheres to a high standard of clarity and readability. The last of a three-volume series, it touches on American dealings with the Chinese Communists, the relief of Gen. Claire L. Chennault, and the events of an unusual period of Asiatic history. The tragic irony revealed by the authors is that Allied victory, coming when it did, in effect doomed Chiang Kai-shek to the eventual loss of the China mainland. However, this is an oversimplified conclusion that serves as a curtain-raiser for an even more tragic period.

## SUPERB ANALYSIS

THE GENERALSHIP OF ALEXANDER THE GREAT. Maj. Gen. J. F. C. Fuller, Rutgers University Press. 336 Pages; Illustrated; Maps; Index; \$7.50.

### Reviewed by

BRIG. GEN. DONALD ARMSTRONG, who has specialized in Greek and Roman military history.

In an age of accelerating scientific revolution, there has been an unfortunate tendency to deny or at least to neglect the validity of the lessons of history. Of what possible interest to the world of 1960 could be the exploits of Philip and Alexander of Macedon 2,400 years ago? Perhaps the events of 1959 are still relevant in 1960, but heaven forbid that we should waste time on these antique figures from the well-forgotten past!

How unfortunate such an attitude can be is convincingly shown in this notable book. It is brief but perceptive biography; it is lucid military history; it is, above all, superb analysis of military-political-psychological cooperation to attain a national objective at the lowest possible price. It is the ideal book for modern man to explain why the nation's military and foreign policies must work closely together to prevent war if possible, and to make victory in war not the end of conflict but the beginning of a better peace. One may hope that since the book has a striking exterior, is beautifully printed, is well supplied with maps and illustrations and is highly readable, it will gain the many readers it deserves.

Here General Fuller is dealing with a revolutionary epoch in which political and social systems were being swept away by irresistible

forces. Because of its many weaknesses the Greek city-state system was disintegrating, to be superseded by the Macedonian empire. Since our own times are characterized by an upheaval similar to the revolutionary period of the Macedonian conquerors, the age fulfills General Fuller's requirements that history can be helpful only if it is concerned with "former periods in which the prevailing conditions resemble those of the present." The book amply proves that the pattern for conquest of Philip and Alexander resembles today's protracted conflict in emphasis on subversion and on the psychological and political approach used by the Sino-Soviet bloc all over the world.

## MONUMENTAL ESSAY

WAR THROUGH THE AGES. Lynn Montross. Harper & Brothers. 1063 Pages; Illustrated; Maps; Index; \$10.00.

### Reviewed by

COL. R. ERNEST DUPUY, distinguished Army historian.

Surveying war, from the days of Alexander the Great to the present time, Lynn Montross finds—quite properly—that man is its one changeless factor. Man makes war, and man makes the weapons with which he wages war.

Therefore, one can learn from the past much of value for the future. The decisiveness of weapons always will depend on "such timeless elements as preparedness, secrecy, deception and surprise."

The will to win is more potent than the material means, for once this aggressive spirit has been lost by an army—or by a people—the jig is up. Napoleon said it: the moral [see ARMY, July] is to the material in war as three is to one. That is the dominant theme of this monumental essay, which attempts to encompass tactical and strategic developments, leadership, weapons, and what Jomini calls "the politics of war."

Actually this is the third edition of a work first published in 1944. Since that time, such things have happened as the cold war between communism and the free world, the Korean war—the fourth largest military effort of the United States, as it turned out—and the fringe of brushfire wars which for more than a decade have framed an exasperated world.

In addition, further light is thrown on World War II from sources not available when the first edition appeared. To confound the



essayist still further, nuclear weapons and the threat of atomic warfare have changed the picture, both tactically and—perhaps—strategically. These new things Montross covers in stride, to produce a thought-provoking supplement to the intelligent study and understanding of war which is indispensable to our nation's survival.

Several lances may be broken with the author regarding his treatment of some historical events, and also the overly heavy weighting of World War II. The period 1939-1960 takes up a good quarter of the book.

However, the author has indeed made his point: the past is prologue. The United States needs the capability for nuclear deterrent action, sea and air supremacy, and limited-war capability. Montross, totting up the score, feels we still lack this last ingredient.

## VICTOR OF GETTYSBURG

MEADE OF GETTYSBURG. By Freeman Cleaves. University of Oklahoma Press. 384 Pages; Illustrated; Maps; Index; \$5.00.

### Reviewed by

COL. FREDERICK BERNAYS WIENER who wrote "Decline of a Leader: The Case of General Meade," in *The Infantry Journal* in 1938-39.

A man may not be a hero to his valet, but he is to his biographer. *Meade of Gettysburg* is no exception to this premise. It is a laudatory life of the victor of Gettysburg but it leaves the reader with the impression that this commander's subsequent decline from then until Appomattox was the result of intrigue, of politicking, and of an inability to recognize a brave and able general.

Mr. Cleaves's favorable estimate is reached, not on the basis of new and unpublished documents—there are very few of these of any historical as distinguished from family significance—but because of his demonstrable failure to consider primary sources that have been in print for many years, notably Meade's wartime letters to his wife. These letters reveal Meade's weaknesses far more clearly than the most vicious of the many contemporary criticisms of which he was the target. The old saw that "No man was ever written out of reputation save by himself" was never more clearly proved.

Meade's letters show, as Mr.

Cleaves's book does not, that as a commander he had very little inner strength, and constantly worried about his reputation, to a point where he was all but dissolved in self-pity, that most corrosive of all emotions. Here are a few significant items from Meade's letters that are not even mentioned: That portion of Meade's letter to Halleck, written on the second day at Gettysburg, just before Sickles's disastrous advance into the Peach Orchard, reading, "I feel fully the responsibility resting on me, but will endeavor to act with caution." His near-hysterical letter home after the Mine Run operation. His request that the President order a court of inquiry to look into the charges made against him before the Committee on the Conduct of the War. His resentment at being superseded, whether by seniors or by juniors.

Meade was an introvert, whose self-preoccupation made him difficult to work with or to get along with others; today DCSPER and GIs of lower headquarters would undoubtedly label him a personality problem, and assign him accordingly. His letters show all this clearly; Mr. Cleaves's biography reveals it hardly at all.

Moreover, Mr. Cleaves yields to the too easy temptation to aggrandize his subject by denigrating Meade's contemporaries. Grant is one of his villains, yet Grant was not clearly as insensible as Meade thought him. Grant simply shrank from telling Meade to his face what all but Meade understood only too well. Significantly, Meade's aide wrote (not quoted by Mr. Cleaves) that "I like to have [Grant] down here—he gives a general balance and steadiness." Nor does the author adequately recount how Meade constantly came running to Grant for consolation when attacked in the newspapers or when not accorded recognition in Washington. Accordingly, Meade's progressive decline in Grant's estimation is explained only as favoritism for Sheridan.

Here again, contemporary comment, even from the most sympathetic of sources, was the other way. To General Schaff, Sheridan was "the one flaming Ithuriel of the North"—and Schaff was an Easterner, sympathetic to Meade,

and deeply conscious of how much the Republic owed him for Gettysburg. Mr. Cleaves frequently quotes Schaff, but omits mention of that officer's characterization of Sheridan.

I once ventured this judgment on Meade: "What, then, shall we say of Meade? That he was too human in his failings to rise to greatness? That he lacked the sympathetic personality which leadership requires? Perhaps something of each. But the final judgment would seem rather to be this: that he pursued fame so jealously and so intently as to assure that eventually it should elude his grasp. And the real tragedy of his life was that, in the process, the laurels of Gettysburg faded."

That was written more than twenty years ago, and much blood and water have run under the bridges since. Every historical estimate, every biographical evaluation, is constantly subject to revision in the light of additional facts, deeper insights, and changing climate of opinion. But no revision can fairly be rested on a disregard of evidence, on a sweeping under the rug of every unfavorable item such as this book reflects.

## ARMOR HISTORY

TANK. Arch Whitehouse. Doubleday & Company. 383 Pages; Illustrated; Maps; Index; \$4.95.

### Reviewed by

BRIG. GEN. PAUL M. ROBINETT, who in North Africa led CCB, 1st Armored Division and was Commandant of the Armor School.

This is the first popular history of the tank that has appeared in America. It includes, besides interesting details concerning the origin and development of the tank, sidelights on the theorists and great leaders of mobile warfare during the wars of the twentieth century, and stories of some of the men who have fought in tanks. It is a serious work that deserves a wide reception that it is apt to get.

Having witnessed the greatest tank battle of World War I, having followed the great campaigns of World War II, and having read many military works and interviewed numerous tankers, Whitehouse concluded "that the tank-crew member has never been awarded his rightful place in the

(continued on p. 116)



**NORTHFIELD, VT.** Maj.Gen. E. N. Harmon (left), President of Norwich University, presents charter to officers of Norwich University Company. Others are Cadets Capt. James W. Bingham, 1st Lt. Rockwood Dunham, 2d Lt. Richard Negus, 1st Sgt. Peter E. Byrne.



**FORT LEONARD WOOD, MO.** New officers of Fort Leonard Wood Chapter with guests. Seated, left to right: Capt. Roy C. Harms; Mr. Dru Pippin; Attorney General John M. Dalton; Maj. Gen. Thomas A. Lane; standing: Mr. Ed. Sowers, Mr. Wilmer Sell, Mr. George Paris, Mr. George Bening.



**ST. LOUIS, MO.** Col. J. P. Stupp, center, accepts St. Louis Chapter's gold plaque from Maj. Gen. L. J. Sverdrup, retiring President. Others are: SFC Gerald K. Wirtjes, Treasurer; Maj. R. M. Ormrod, Secretary; Col. Frank P. Burk, Second Vice President.



**CAMP KILMER, N. J.** Distinguished guests at charter meeting of Northern New Jersey Chapter on 16 February. Left to right: Maj. Gen. Edward O. Wolf, CG, 50th Armd Division; Maj. Gen. James F. Cantwell, Chief, N. J. Department of Defense; Col. William L. O'Dea, Provisional President; Brig. Gen. David E. Mayer, CG, 818th Hospital Center; Maj. Gen. Raymond W. Curtis, CG, II Army Corps.



**BAKERSFIELD, CALIF.** Walter Rowse, President of Greater Bakersfield Chamber of Commerce, presents charter for Bakersfield Chapter to President William J. Brady. Left to right: Lt.Col. Robert Jay, Maj. Henry Niskanen, Mr. Rowse, Major Brady, Sgt. Kenneth Thompson.

## AUSA CHAPTERS and ROTC COMPANIES on the GO for the ARMY



**FORT RILEY, KANS.** Four generals get together during a dinner meeting on 27 April, given by Fort Riley-Central Kansas Chapter in honor of Maj.Gen. Terry Allen, wartime 1st Division CG, and Maj.Gen. Sam C. Russell, CG, AADC, Fort Bliss. Left to right: Brig.Gen. William B. Kunzig, Assistant Commander, 1st Division; General Allen; General Russell; and Maj.Gen. Theodore W. Parker, CG, 1st Infantry Division and Fort Riley.



**HEIDELBERG, GERMANY.** Gen. C. D. Eddleman (left), CG, USAREUR, accepts from Lt. Gen. Walter L. Weible, Executive Vice President of AUSA, souvenir stein commemorating AUSA-sponsored trip of industrialist members to Army installations in Europe during April. Presentation was feature of Chapter's dinner meeting of nearly 600 who heard General Eddleman as principal speaker.



**HUNTSVILLE, ALA.** Dr. Wernher von Braun (right) and Dr. Ernst Stuhlinger (left), of ABMA, receive AUSA Certificates of Appreciation from George Washington Chapter. Maj. Gen. August Schomburg, CG, Army Ordnance Missile Command, presented the awards to the two scientists for their "unceasing efforts in the development and production of missiles which are keeping our Army more modern than tomorrow."



**FORT STEWART, GA.** Lt. Gen. Alvan C. Gillem, former commander of Third Army, and Lt. Gen. Joseph B. Fraser, President of Coastal Empire Chapter, at meeting of Chapter on 21 May, where General Gillem was principal speaker.



## ASSOCIATION OF THE U. S. ARMY

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THE ASSOCIATION OF THE U. S. ARMY shall be an organization wherein all who are in accord with its objectives may join in the exchange of ideas and information on military matters, and in fostering, supporting, and advocating the legitimate and proper role of the Army of the United States and of all its branches and components in providing for and assuring the Nation's military security.

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# 1960 REUNION CALENDAR

As in former years, ARMY is publishing the 1960 calendar of reunions and conventions of divisions and higher commands. We endeavor to keep this list current and accurate but cannot be held responsible for omissions or errors. Nor can we provide further information.

## AUGUST

1st Armd. Div. 26-27 Aug. Sheraton-Park Hotel, Washington, D. C. Write Col. Leo E. Conner, 1529 18 St., N.W., Washington 6, D. C.

1st Inf. Div. 18-21 Aug. Congress Hotel, Chicago, Ill. Write Arthur L. Chaitt, 5 Montgomery Ave., Philadelphia 18, Penna.

7th Armd. Div. 19-21 Aug. Jung Hotel, New Orleans, La. Write Johnnie Walker, 375 Valley Road, Hawthorth, N. J.

11th Armd. Div. 18-20 Aug. Roosevelt Hotel, New York, N. Y. Write Ray S. Buch, 159 Leigh St., Clinton, N. J.

16th Armd. Div. 12-14 Aug. Benjamin Franklin Hotel, Philadelphia, Pa. Write Lester Bennett, 5820 Recamper Drive, Toledo 13, Ohio.

17th Abn. Div. 12-14 Aug. Sheraton Hotel, Cincinnati, Ohio. Write W. A. Roncone, 802 Hiland Ave., Coraopolis, Pa.

24th Inf. Div. 12-14 Aug. Ambassador Hotel, Atlantic City, N. J. Write Edmund F. Henry, 21 Park St., Attleboro, Mass.

31st Inf. Div. 18-21 Aug. Morrison Hotel, Chicago, Ill. Write William F. Bedow, Sr., 3012 W. Belmont Ave., Chicago 18, Ill.

69th Inf. Div. 22-28 Aug. Galen Hall Hotel, Wernersville, Pa. Write Cyril Baron C/o N&B Spraying Co., 315 W. 36 St., New York, N. Y.

78th Inf. Div. Indefinite. Fort Dix, N. J. Write John E. Ghegan, 975 52 St., Brooklyn 19, N. Y.

83d Inf. Div. 18-20 Aug. Statler Hotel, Boston, Mass. Write George Cooley, 1459 Beachwood St. NW, Warren, Ohio.

84th Inf. Div. 22-24 Aug. Statler-Hilton Hotel, Buffalo, N. Y. Write Lee C. Allen, PO Box 141, Canton, Ohio.

87th Inf. Div. 26-28 Aug. Henry Hudson Hotel, New York, N. Y. Write W. M. Churchill, 141 Livingstone St., Brooklyn 1, N. Y.

95th Inf. Div. 19-21 Aug. Washington, D. C. Write F. E. Safarik, Box 1274, Chicago, Ill.

101st Abn. Div. 12-13 Aug. Statler-Hilton Hotel, Detroit, Mich. Write Col. Leo B. Conner, 1529 18 St., N. W., Washington 6, D. C.

First Special Service Force. 12-13 Aug. Menrose Hotel, Detroit, Mich. Write Eugene V. McCormick, 1901 S. Fourth St., Lafayette, Ind.

Persian Gulf Command Vets. 13-14 Aug. Fitzsimons Army Club, Denver, Colo. Write C. T. Perkins, 11 E. Fifth St., Tempe, Ariz.

## SEPTEMBER

5th Inf. Div. 3-5 Sep. Wisconsin Hotel, Milwaukee, Wis. Write Charles P. DeRose, 45 Catskill Ave., Yonkers 4, N. Y.

6th Armd. Div. 1-4 Sep. Hilton Hotel, Pittsburgh, Pa. Write Edward F. Reed, PO Box 492, Louisville 1, Ky.

10th Armd. Div. 3-5 Sep. Detroit, Mich. Write J. Edwin Grace, 108 Langdon Ave., Watertown 72, Mass.

27th Inf. Div. 16-17 Sep. Marcy Hotel, Lake Placid, N. Y. Write Lawrence Reagan, PO Box 1403, Albany 1, N. Y.

29th Inf. Div. 2-5 Sep. Benjamin Franklin Hotel, Philadelphia, Pa. Write Kalmon E. Marmer, 624 Mississippi Ave., Silver Spring, Md.

32nd Inf. Div. 3-5 Sep. Occidental Hotel, Muskegon, Mich. Write Joseph A. Hrdlick, 1519 N. 50th Place, Milwaukee, Wis.

34th Inf. Div. 9-11 Sep. Savery Hotel, Des Moines, Iowa. Write Lt. Col. Junior F. Miller, Red Horse Armory, Des Moines, Iowa.

35th Inf. Div. 16-18 Sep. Statler-Hilton Hotel, St. Louis, Mo. Write Brig. Gen. Mahlon S. Weed, PO Box 1001, Kansas City, Mo.

36th Inf. Div. 2-4 Sep. Gunter Hotel, San Antonio, Tex. Write Harold D. Loftus, PO Box 5068, West Austin Sta., Austin, Tex.

37th Inf. Div. 3-5 Sep. Mayflower Hotel, Akron, Ohio. Write Jack R. McGuire, Room 1101, 21 W. Broad St., Columbus 15, Ohio.

43rd Inf. Div. 9-11 Sep. Long Trail Lodge, Sherburne, Vt. Write Col. Joseph E. Zimmer, State Armory, Hartford 15, Conn.

65th Inf. Div. 23-24 Sep. Willard Hotel, Washington, D. C. Write Perry House, Bendersville, Pa.

100th Inf. Div. 9-11 Sep. Henry Hudson Hotel, New York, N. Y. Write Thomas C. Burdett, 114 S. Main St., Taylor, Pa.

104th Inf. Div. 2-5 Sep. Statler-Hilton Hotel, Boston, Mass. Write Howard S. Bedney, 695 Hewlett St., Franklin Square, N. Y.

VII Corps Veterans Assn. 4-8 Sep. Shroder Hotel, Milwaukee, Wis. Write S. C. Hutchinson, 706 Lafayette Ave., Colonial Heights, Va.

Merrill's Marauders. 2-4 Sep. Treadway Inn, St. Davids, Pa. Write David Hurwitt, 22 Basket Lane, Hicksville, N. Y.

## OCTOBER

45th Inf. Div. 28-30 Oct. Windsor Hotel, Abilene, Tex. Write Maj. Rex Wilson, 2205 N. Central, Oklahoma City 5, Okla.

## NOVEMBER

77th Inf. Div. 12 Nov. Edison Hotel, New York, N. Y. Write Charles E. Rist, 28 East 39 St., New York 16, N. Y.

82nd Div. (WWI). 13 Nov. Dempsey Hotel, Macon, Ga. Write James F. Brown, Jr., 1005 Bankers Insurance Bldg., Macon, Ga.

(continued from p. 113)

history of modern war." While reading *Tank* it is well to keep this in mind, for the author goes out of his way to record the exploits of tankers.

There are some errors, but few if any are serious. The role of the British, although highly important, is overplayed. This is understandable when you consider the volume of writing about tanks and armored warfare that has been done by the British. American pioneers, such as General Chaffee, confined themselves largely to action and to education within the Army. They visualized the integration of appropriate elements of all arms and services into a fast-moving force capable of restoring strategic mobility in a theater of operations. With the theorists they hoped this would prevent a repetition of the terrible hardships and enormous casualties suffered by the infantry during World War I. These men appreciated the support role of the tank, but they visualized something completely beyond its use as merely a support weapon. Their dreams of armored armies were not fulfilled. Even the armored corps was discarded before it was tried in battle.

Comparisons of tanks are about as useful as comparisons of generalship. As the author indicates, there is no tank that is best under all conditions. They must be adapted to the weather, terrain, enemy, and missions envisaged. For instance, in Europe General Patton was fortunate to have equipment suited to his temperament and the terrain occupied by an enfeebled enemy. It is not likely he would have done better with T34 tanks. He might have done worse. This is not to say the tank picture was all rosy in the United States. Responsible officers at the Armored Center were not entirely satisfied with our tanks. They were constantly collecting and collating data concerning all known tanks and striving for better equipment. Their views were reluctantly accepted only after the need was established in combat.

The author has given armored experience in Korea short shrift, for it was a defensive or containing affair where terrain was poorly suited for tanks of a type best suited for great sweeps such as were made by Patton. A thorough study of Korea might be more fruitful to American soldiers than a study of Allied campaigns in Africa and western Europe.

**...NEWS IS HAPPENING AT NORTHROP**

This thirty-first parachute decal denotes the successful completion of as many surveillance missions. Informally dubbed "Repeater" by its crew, this is not an unusual SD-1. Many Radioplane SD-1 drones have exceeded "Repeater's" record, because Radioplane designs these systems to be rugged, simple, and *reliable*.



**ARMY'S SD-1 RACKS UP 31 MISSIONS  
...READY FOR 31 MORE!**

At the Army Electronic Proving Ground, Fort Huachuca, Arizona, tough little SD-1 drones from Radioplane perform mission after mission training troops in the tactical use of drone aerial surveillance. Under the direction of the U.S. Army Combat Surveillance and Target Acquisition Training Command, they are launched and return with photo intelligence within minutes. The SD-1 serves our tactical organizations in the U.S. and overseas in Europe and the Far East.

Reliability is the keynote in Radioplane design whether the product is a tactical SD-1 drone like "Repeater," a target missile, or a landing system for a space vehicle.

**PILOTLESS AIRCRAFT**  
FOR AERIAL SURVEILLANCE  
FOR TARGET TRAINING  
FOR WEAPON SYSTEM EVALUATION



**RADIOPLANE**

A Division of **NORTHROP CORPORATION**  
Van Nuys, California, and El Paso, Texas



**Arming America's Pentomic Army.** Global commitments... daily readiness... combat capability by the hour. These shape the needs of our new Pentomic Army. Its ordnance must match the coiled-spring readiness of this flexible striking force. Avco's Crosley Division is working with the Army to develop a variety of such new and sophisticated ordnance. These activities cover a broad portion of the ordnance spectrum and include arming and fuzing, ballistics, projectiles, microminiaturized electronic assemblies, and many others.

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